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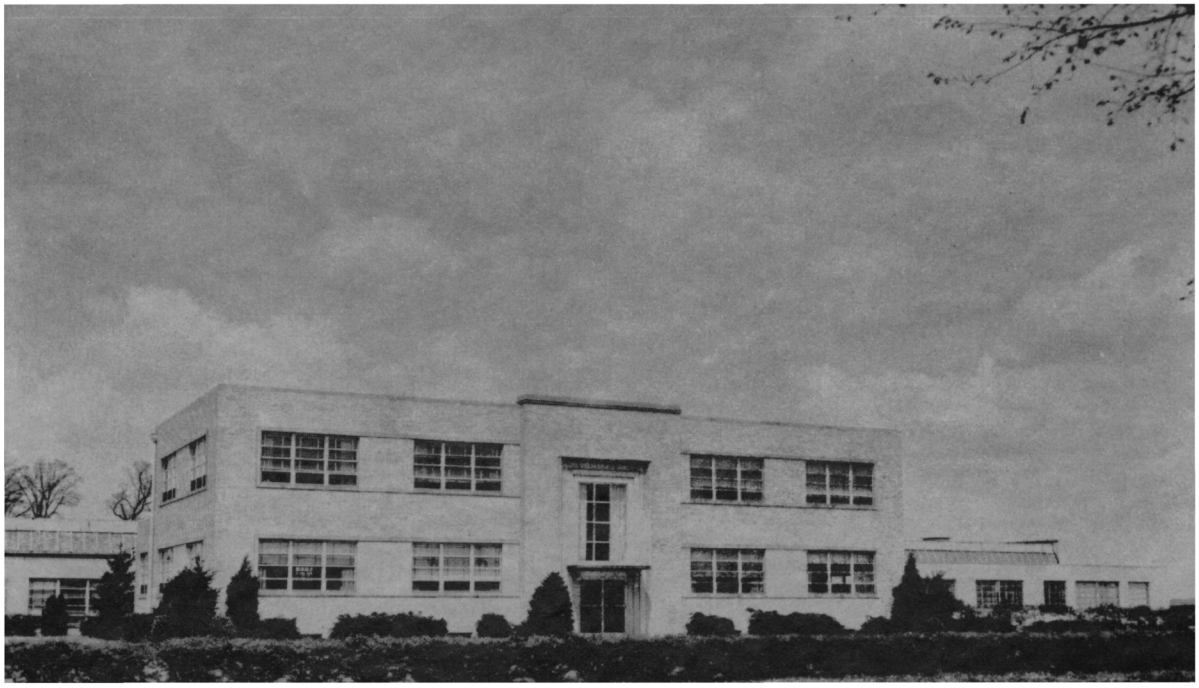

RESEARCH FOUNDATION

Columbus 8, Ohio

Report 825-1-Part II
IGY Project No. 4.10
NSF Grant No. Y/4.10/285

USNC-IGY ANTARCTIC GLACIOLOGICAL DATA
FIELD WORK 1957 AND 1958

Richard P. Goldthwait
December 1958

RF Project 825
Report No. 1
Part II

REPORT

BY

THE OHIO STATE UNIVERSITY

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USNC-IGY ANTARCTIC GLACIOLOGICAL DATA

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December 1958

Submitted to
The U. S. National Committee for the IGY,
National Academy of Sciences, in Partial Fulfillment
of IGY Project Number 4.10-NSF Grant No. Y/4.10/285

by

Richard P. Goldthwait
Department of Geology

BYRD STATION GLACIOLOGICAL DATA 1957-1958

By V. H. Anderson

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BYRD STATION

INTRODUCTION

This report concerning the glaciology of a portion of western Antarctica, Marie Byrd Land, is presented in three sections. The first section records the observations made along a 640-mile over-snow traverse from Little America to Byrd Station during February 1957. The second section contains observations made during a wintering-over period in 1957 at Byrd Station. The final section contains data collected during a 1957-58 over-snow traverse to the north and east of Byrd Station. Traverse route map is found in pouch at the end of this report.

Glaciological field observations were conducted by Vern Anderson and Mario Giovinetto throughout the Little America-Byrd Station Traverse and the wintering-over period at Byrd Station. Glaciological observations were conducted on the Marie Byrd Land Traverse by Vern Anderson and William Long. Special acknowledgment is made to Norbert Helfert, a Byrd Station meteorological observer, who assisted in traverse glaciological studies during the first two weeks of the Marie Byrd Land Traverse.

This report was prepared by Vern Anderson, glaciologist at Byrd Station during 1957-58, under the direction of Dr. Richard P. Goldthwait and Mr. Richard Cameron, at the IGY Glaciological Data Reduction Office, The Ohio State University Research Foundation, Columbus, Ohio.

ACCURACY OF OBSERVATIONS

Firn temperatures taken by Weston dial thermometers are considered accurate to only 0.5°C. Curves drawn through firn temperature values are average; actual observed values are plotted as points. Temperatures taken in core holes at depth, by using thermohm and Wheatstone bridge, are considered reliable to 0.01°C.

Density values of snow samples taken on the traverse and from the deep pit at Byrd Station are recorded only to two decimal places. Difficulties in trimming core sections uniformly and variations inherent in the type of balance used did not allow for any greater precision. The balance variations together with human error, render the density values accurate to only 0.005 gms/cm^3.

Uniformity in ram hardness measurements were obtained by the continued operation of the rammsonde by one person and the recording of data by the other man.

Through continued use and wear, the rammsonde became a liability to the travel program of the traverse party. Much time and energy were wasted recovering the penetrating section of the instrument which was lost at a depth of 2 - 3 meters due to worn jointing systems.

SECTION I

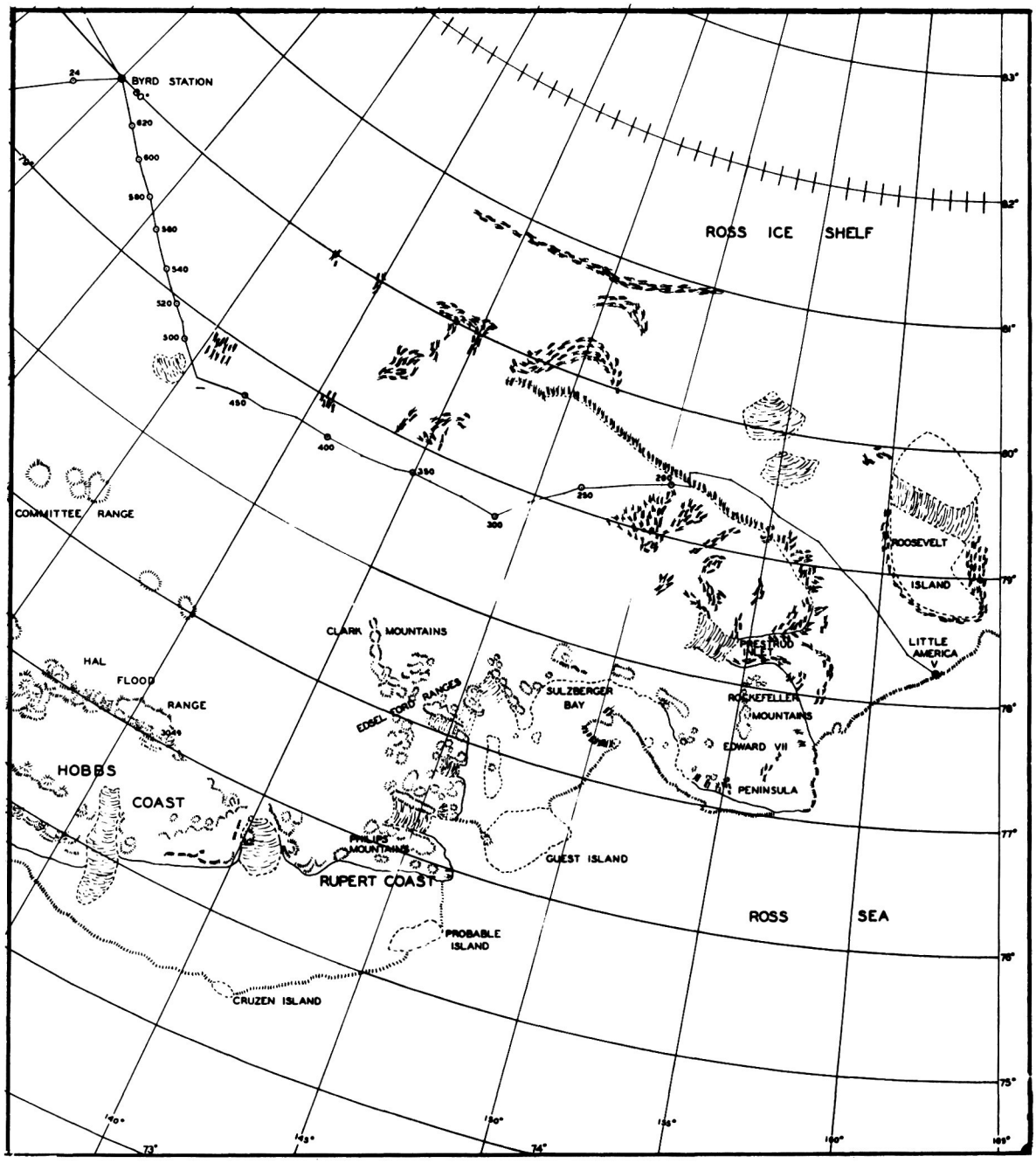
LITTLE AMERICA--BYRD TRAVERSE

On January 28, 1957, a group of five men consisting of two seismologists, two glaciologists, and a mechanic, left Little America to travel by Sno-Cat to Byrd Station 640 miles to the east. (See map on following page.) The traverse party rapidly covered the first 200 miles of the route before starting a detailed seismological and glaciological program. Two factors were involved in the decision to cover hastily the first 200 miles of the traverse. First was the lateness of the season, considering the distance to travel before winter arrived, and the second was that a traverse was planned from Little America for the following summer to cover the Ross Ice Shelf, including the portion between Little America and mile 200. However gravity, magnetic, and altimetry observations along with rammsonde measurements were made while traveling to mile 200. From mile 200 to 500 the party stopped every 50 miles for a day's study and spent alternate days traveling. From mile 500 to Byrd Station day-long stops were made every 20 miles. Each stop, or pit stop as it was called, was joined to the next by a series of rammsonde measurements taken between pits during a day of traveling.

The glaciological program consisted of the study of pits 2 meters in depth at each major stop along the traverse route. Studies were made of snow density, grain size, type, and temperature. A hole was augered to 6 meters in depth and the temperature was obtained at the level by the use of a thermohm and a Wheatstone bridge. (A plot of these 6 meter temperatures against a profile of the trail to Byrd Station is presented at the end of this section of the report.) A written stratigraphic record of each pit and the snow hardness values were also obtained.

Accumulation stakes were placed at intervals along the traverse and accumulation values were recorded 9 months and 12 months later by travelers along this same trail. (These values are also given at the end of the first section of the report.)

The glaciological material is presented in the order it was observed and recorded in the field. Each pit is worked out in detail, while ram hardness numbers are listed and inserted between pit stops. Immediately preceding these data is a listing of rammsonde and pit site locations and elevations, and a sketch map of the route traveled by the traverse party.



SKETCH MAP OF LITTLE AMERICA - BYRD STATION TRAVERSE ROUTE

LITTLE AMERICA--BYRD TRAVERSE
RAMMSONDE (R) AND PIT (P) ELEVATIONS AND POSITIONS

Mile	Study	Elevation (meters)	Position South Latitude	Position West Longitude
Little America		43	78°16'	162°28'
20	R	59	78°24.8'	161°20'
40	R	65	78°38'	160°22'
60	R	72	78°51.3'	159°25.7'
80	R	79	79°02.2'	158°19.5'
100	R	78	79°13.9'	157°06.5'
120	R	75	79°23.1'	155°21.9'
140	R	77	79°28.9'	154°26.5'
160	R	69	79°35.2'	152°56'
180	R	61	79°34.5'	151°21.5'
200	P	288	79°26.1'	150°25.9'
220	R	479	79°20.4'	148°39'
240	R	591	79°14.8'	147°29'
250	P	603	79°12.3'	146°46.9'
260	R	679	79°06.5'	146°08'
280	R	753	78°57.4'	144°49'
300	P	719	78°44.9'	143°49'
320	R	683	78°47.7'	142°09'
340	R	648	78°47.7'	140°40'
350	P	649	78°47.2'	139°58'
360	R	690	78°46.7'	139°16.9'
380	R	786	78°45'	137°46.7'
400	P	909	78°45.4'	136°17'
420	R	1033	78°45.2'	134°41'
440	R	1160	78°41.9'	133°23.4'
450	P	1233	78°40.5'	132°35'
460	R	1277	78°39'	131°47'
480	R	1387	78°35.7'	130°28'
500	P	1404	78°47.3'	129°13'
510	R	1415	78°52.5'	128°41'
520	P	1466	78°58'	128°05'
530	R	1475	79°02.9'	127°31'
540	P	1454	79°07.8'	126°57'
550	R	1447	79°13.8'	125°15.3'
560	P	1435	79°19.4'	125°34.2'
570	R	1414	79°23.1'	124°02.2'
580	P	1423	79°28.7'	124°24.2'
590	R	1409	79°33.6'	123°42'
600	P	1422	79°38.5'	123°00'
610	R	1455	79°43'	122°37'
620	P	1460	79°47.2'	121°46'
630	R	1486	79°52'	121°05'
640	R	1512	79°57'	120°25.9'

RAM HARDNESS DATA SHEET

Station LA--Byrd Traverse
Observers Anderson, Giovinetto

Depth cm	Hardness Number, Kg
Mile 20	
29 January 1957	
0- 8	
8- 11	5
11- 12	22
12- 15	35
15- 18	9
18- 20	12
20- 22	12
22- 23	22
23- 25	12
25- 27	12
27- 29	12
29- 30	22
30- 33	9
33- 35	12
35- 37	12
37- 39	12
39- 40	22
40- 42	32
42- 49	19
49- 51	12
51- 53	12
53- 55	12
55- 56	22
56- 59	9
59- 63	7
63- 66	9
66- 72	5
72- 75	9
75- 77	12
77- 79	12
79- 82	9
82- 85	9
85- 88	9
88- 89	22
89- 90	22
90- 95	15
95-100	7
100-105	7
105-108	10
108-110	13
110-116	10
116-117	23
117-120	23
120-127	12
127-132	15
132-138	16
138-145	17
145-150	19
150-154	28
154-157	23
157-167	27
167-170	50
170-171	155
171-172	155
172-176	155
176-181	35
181-187	30
187-193	30
193-197	43
197-199	81
199-201	81
201-205	118
205-209	81
209-214	36
214-217	56
217-222	126
222-231	206
231-233	81
233-237	43
237-241	43
241-244	56
244-250	31
250-260	81
260-263	56
263-275	131
275-282	92
282-285	56
285-288	56
288-290	81
290-296	256
296-301	127
301-305	82
305-309	157
309-319	127
319-333	125
333-334	307
334-337	307
337-341	345
341-345	119
345-351	132
351-362	143
362-365	57
365-368	107
368-374	207
374-376	82
376-380	44
380-382	82
382-385	107
385-387	157
387-396	207
396-400	232
Mile 40	
29 January 1957	
0- 7	
7- 11	15
11- 13	27
13- 15	27
15- 17	27
17- 19	27
19- 20	52
20- 23	18
23- 24	52
24- 27	18
27- 30	18
30- 32	27
32- 34	27
34- 36	27
36- 38	27
38- 40	27
40- 45	12
45- 51	10
51- 55	15
55- 61	10
61- 63	27
63- 65	27
65- 67	27
67- 69	27
69- 70	52
70- 72	27
72- 73	52
73- 75	52
75- 76	52
76- 78	27
78- 80	27
80- 81	52
81- 83	27
83- 87	15
87- 92	12

RAM HARDNESS DATA SHEET

Station LA--Byrd Traverse
Observers Anderson, Giovinetto

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
92- 94	28	218-226	25	18- 21	18
94- 96	28	226-229	56	21- 25	15
96-100	15	229-235	31	25- 28	18
100-103	19	235-240	36	28- 35	9
103-105	28	240-242	81	35- 39	15
105-108	19	242-248	131	39- 41	27
108-111	19	248-264	128	41- 43	27
111-113	28	264-267	56	43- 47	15
113-115	28	267-271	43	47- 58	7
115-116	53	271-273	81	58- 62	15
116-117	53	273-277	43	62- 63	52
117-120	19	277-282	36	63- 64	52
120-122	28	282-285	56	64- 65	52
122-123	53	285-287	81	65- 66	52
123-125	28	287-289	81	66- 70	15
125-126	53	289-292	56	70- 75	12
126-127	53	292-298	182	75- 78	18
127-128	103	298-302	119	78- 80	27
128-129	53	302-304	82	80- 82	27
129-133	15	304-307	57	82- 84	52
133-135	28	307-312	37	84- 87	18
135-136	53	312-318	32	87- 90	18
136-139	19	318-320	82	90- 92	28
139-141	28	320-325	67	92-101	9
141-142	53	325-328	57	101-104	19
142-144	28	328-332	44	104-107	19
144-147	36	332-334	82	107-108	53
147-148	53	334-335	157	108-110	28
148-150	28	335-350	157	110-114	15
150-153	19	350-351	307	114-117	19
153-156	19	351-354	107	117-120	19
156-157	55	354-358	195	120-122	28
157-161	65	358-369	130	122-124	28
161-164	19	369-375	132	124-127	19
164-167	19	375-377	157	127-131	15
167-170	19	377-379	157	131-133	28
170-171	53	379-380	307	133-134	53
171-175	115	380-394	221	134-135	53
175-178	56	394-400	282	135-140	43
178-186	25			140-142	28
186-191	36	Mile 60		142-144	53
191-194	56	30 January 1957		144-146	28
194-197	56	0- 5		146-149	19
197-199	81	5- 12	3	149-151	28
199-202	56	12- 13	12	151-153	28
202-206	43	13- 14	22	153-157	53
206-218	19	14- 18	15	157-160	53

RAM HARDNESS DATA SHEET

Station LA--Byrd Traverse
Observers Anderson, Giovinetto

Depth cm	Hardness Number, Kg
160-174	16
174-178	42
178-181	55
181-184	55
184-186	80
186-188	80
188-191	55
191-195	42
195-198	55
198-201	55
201-203	30
203-206	56
206-209	106
209-214	66
214-219	66
219-224	66
224-227	106
227-233	56
233-244	33
244-250	31
250-256	56
256-270	113
270-276	56
276-281	66
281-284	56
284-287	56
287-289	81
289-292	57
292-298	57
298-301	107
301-309	45
309-316	50
316-325	207
325-332	50
332-336	45
336-338	82
338-346	45
346-375	83
375-380	122
380-384	82
384-388	82
388-400	257

Mile 80
30 January 1957

0- 7	
7- 10	12
10- 18	5
18- 24	10
24- 27	18
27- 30	18
30- 33	18
33- 34	52
34- 36	27
36- 38	27
38- 40	27
40- 44	15
44- 55	7
55- 60	12
60- 62	27
62- 64	27
64- 67	18
67- 77	17
77- 81	15
81- 89	8
89- 95	10
95- 97	28
97- 99	28
99-103	15
103-106	19
106-108	28
108-110	28
110-111	53
111-115	15
115-118	19
118-119	53
119-121	28
121-124	19
124-128	15
128-133	13
133-136	19
136-139	19
139-140	56
140-143	36
143-148	43
148-154	20
154-170	34
170-182	136
182-190	86
190-197	40
197-204	40
204-211	11
211-215	16
215-233	60
233-241	154
241-242	204
242-244	81
244-245	156
245-249	306
249-255	81
255-260	66
260-265	36
265-273	43
273-280	27
280-284	81
284-289	36
289-295	32
295-301	57
301-307	32
307-313	32
313-318	67
318-327	74
327-335	120
335-341	165
341-344	57
344-349	37
349-353	82
353-386	66
386-390	232
390-394	44
394-397	107
397-400	157

Mile 100
30 January 1957

0- 7	
7- 9	7
9- 10	12
10- 11	12
11- 12	12
12- 13	12
13- 19	10
19- 26	9
26- 29	18
29- 40	7
40- 46	10
46- 48	27
48- 50	27
50- 53	18
53- 58	12
58- 69	7

RAM HARDNESS DATA SHEET

Station LA--Byrd Traverse
Observers Anderson, Giovinetto

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
69- 70	52	308-315	221	92- 93	52
70- 72	52	315-317	157	93- 97	28
72- 76	27	317-319	232	97-101	19
76- 79	35	319-328	207	101-103	28
79- 81	27	328-333	277	103-104	103
81- 86	12	333-335	232	104-108	53
86- 90	27	335-338	257	108-112	15
90- 95	13	338-342	157	112-116	15
95- 99	28	342-348	82	116-118	28
99-103	28	348-353	37	118-120	28
103-104	53	353-357	44	120-122	28
104-108	40	357-361	44	122-124	28
108-115	24	361-363	82	124-126	28
115-117	28	363-367	44	126-129	19
117-121	28	367-370	57	129-132	19
121-125	28	370-372	82	132-134	31
125-137	20	372-373	157	134-137	36
137-155	22	373-374	307	137-143	28
155-171	25	374-378	119	143-150	24
171-177	78	378-381	57	150-157	32
177-180	19	381-385	44	157-165	34
180-185	43	385-394	24	165-169	28
185-189	16	394-400	32	169-174	63
189-191	29			174-183	20
191-192	54	Mile 120		183-190	17
192-194	79	31 January 1957		190-194	16
194-198	54	0- 6		194-196	29
198-204	37	6- 10	15	196-200	54
204-213	71	10- 14	15	200-205	34
213-217	91	14- 18	15	205-208	37
217-220	204	18- 21	18	208-210	54
220-223	256	21- 25	15	210-216	129
223-226	56	25- 28	18	216-219	104
226-231	36	28- 33	12	219-223	54
231-233	81	33- 38	12	223-228	34
233-236	56	38- 44	10	228-233	54
236-248	18	44- 52	8	233-240	40
248-265	15	52- 60	8	240-244	16
265-273	25	60- 68	8	244-248	29
273-279	31	68- 74	10	248-254	71
279-285	31	74- 76	27	254-256	29
285-288	56	76- 81	12	256-260	29
288-292	44	81- 84	18	260-263	37
292-295	57	84- 86	27	263-270	28
295-297	157	86- 89	18	270-273	57
297-301	44	89- 90	52	273-275	82
301-308	28	90- 92	27	275-278	57

RAM HARDNESS DATA SHEET

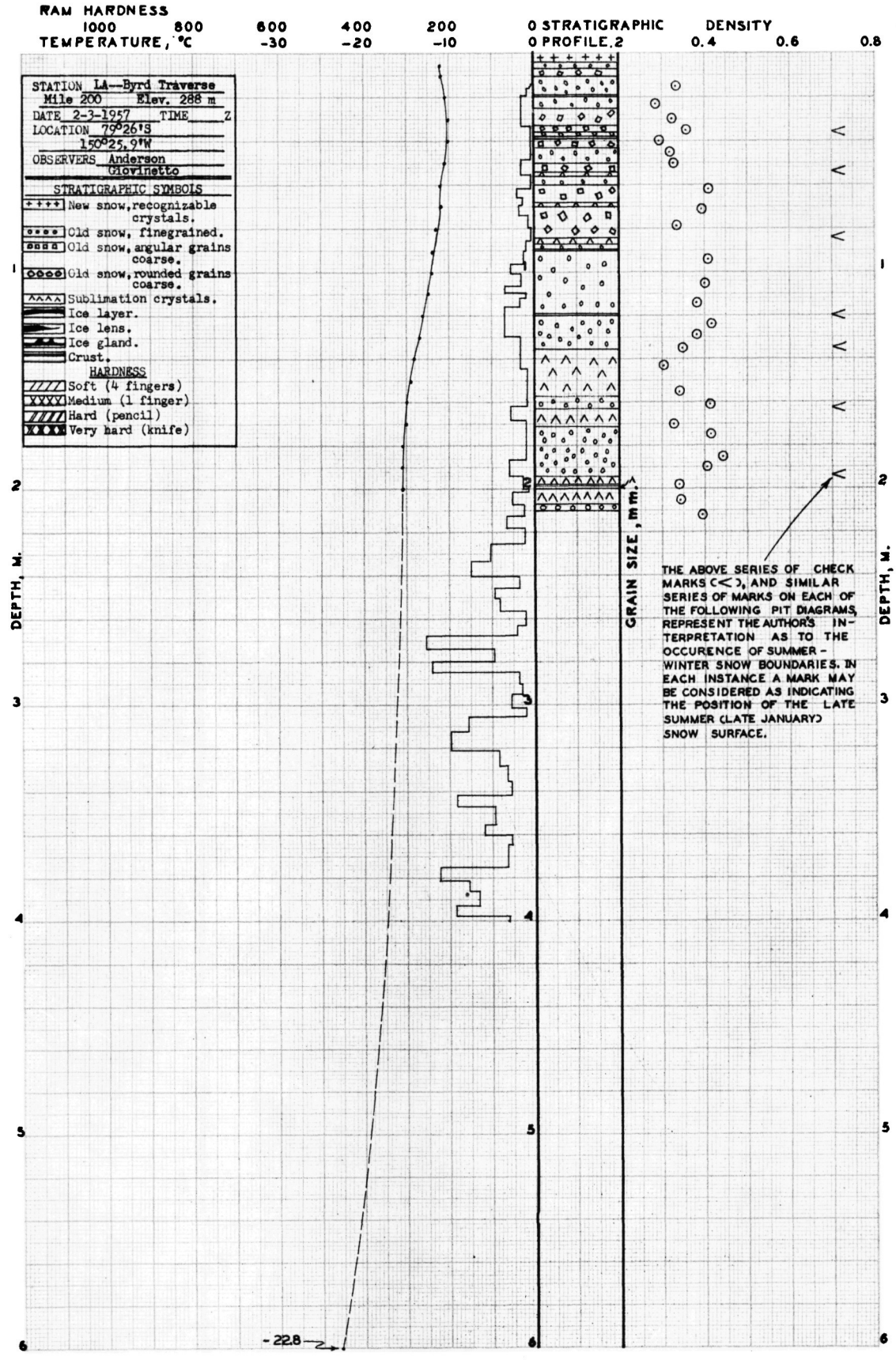
Station LA--Byrd Traverse
Observers Anderson, Giovinetto

Depth cm	Hardness Number, Kg
278-282	44
282-291	24
291-294	57
294-297	57
297-299	82
299-300	157
300-301	157
301-302	157
302-306	44
306-316	232
316-321	157
321-325	44
325-331	257
331-345	103
345-362	307
362-368	82
368-378	37
378-390	32
390-393	57
393-395	82
395-397	82
397-399	82
399-400	57
Mile 140	
31 January 1957	
0- 12	
12- 15	35
15- 16	52
16- 40	4
40- 50	12
50- 54	27
54- 60	19
60- 71	7
71- 77	60
77- 81	15
81- 83	27
83- 91	33
91- 94	18
94-103	14
103-109	20
109-117	28
117-126	25
126-135	25
135-143	22
143-155	15
155-162	10
162-171	9
171-180	109
180-185	103
185-194	25
194-200	46
200-205	34
205-210	44
210-220	9
220-222	79
222-231	13
231-235	21
235-237	36
237-238	66
238-239	126
239-243	81
243-250	70
250-255	66
255-261	56
261-270	56
270-281	33
281-291	186
291-296	157
296-304	101
304-307	207
307-317	37
317-326	190
326-329	107
329-334	157
334-338	344
338-344	107
344-351	71
351-366	207
366-369	57
369-373	45
373-376	107
376-385	224
385-400	77
Mile 160	
1 February 1957	
0- 10	
10- 13	18
13- 17	15
17- 21	15
21- 25	15
25- 30	12
30- 54	4
54- 58	39
58- 68	82
68- 71	52
71- 75	39
75- 78	52
78- 87	8
87- 92	12
92-100	40
100-105	33
105-118	26
118-124	211
124-129	183
129-138	103
138-144	28
144-146	78
146-163	20
163-174	44
174-200	20
200-215	16
215-222	49
222-231	23
231-238	49
238-243	36
243-253	21
253-264	183
264-267	56
267-270	106
270-274	81
274-278	81
278-287	56
287-293	82
293-299	307
299-304	307
304-308	119
308-311	57
311-316	187
316-323	71
323-331	63
331-346	107
346-354	101
354-373	54
373-387	81
387-399	57
399-401	82

RAM HARDNESS DATA SHEET

Station LA--Byrd Traverse
Observers Anderson, Giovinetto

Depth cm	Hardness Number, Kg
Mile 180	
1 February 1957	
0- 10	
10- 13	18
13- 16	52
16- 21	22
21- 25	27
25- 36	11
36- 48	6
48- 57	8
57- 65	183
65- 71	102
71- 73	52
73- 77	39
77- 81	39
81- 89	46
89- 92	18
92- 99	24
99-106	24
106-109	36
109-110	103
110-113	55
113-116	55
116-129	17
129-146	14
146-155	22
155-160	35
160-168	61
168-190	12
190-202	18
202-208	31
208-215	27
215-224	39
224-226	81
226-227	156
227-236	23
236-244	80
244-251	27
251-262	43
262-266	43
266-272	31
272-281	270
281-285	118
285-287	156
287-292	97
292-303	48
303-312	57
312-318	82
318-327	224
327-333	157
333-344	48
344-354	97
354-367	76
367-370	257
370-379	40
379-386	28
386-390	119
390-396	82
396-400	82


RAM HARDNESS
1000 800 600 400 200 0
TEMPERATURE, °C -30 -20 -10
STRATIGRAPHIC PROFILE
DENSITY 0.2 0.4 0.6 0.8
STATION LA--Byrd Traverse
Mile 200 Elev. 288 m
DATE 2-3-1957 TIME Z
LOCATION 79°26'S
150°25.9'W
OBSERVERS Anderson
Giovinetto
STRATIGRAPHIC SYMBOLS
New snow, recognizable crystals.
Old snow, finegrained.
Old snow, angular grains coarse.
Old snow, rounded grains coarse.
Sublimation crystals.
Ice layer.
Ice lens.
Ice gland.
Crust.
HARDNESS
Soft (4 fingers)
Medium (1 finger)
Hard (pencil)
Very hard (knife)
DEPTH, M.
GRAIN SIZE, mm.
-22.8
THE ABOVE SERIES OF CHECK MARKS (< >), AND SIMILAR SERIES OF MARKS ON EACH OF THE FOLLOWING PIT DIAGRAMS, REPRESENT THE AUTHOR'S INTERPRETATION AS TO THE OCCURENCE OF SUMMER - WINTER SNOW BOUNDARIES. IN EACH INSTANCE A MARK MAY BE CONSIDERED AS INDICATING THE POSITION OF THE LATE SUMMER (LATE JANUARY) SNOW SURFACE.

LA-Byrd Traverse
Station Mile 200
Date 3 February 1957
Observers Anderson, Giovinetto

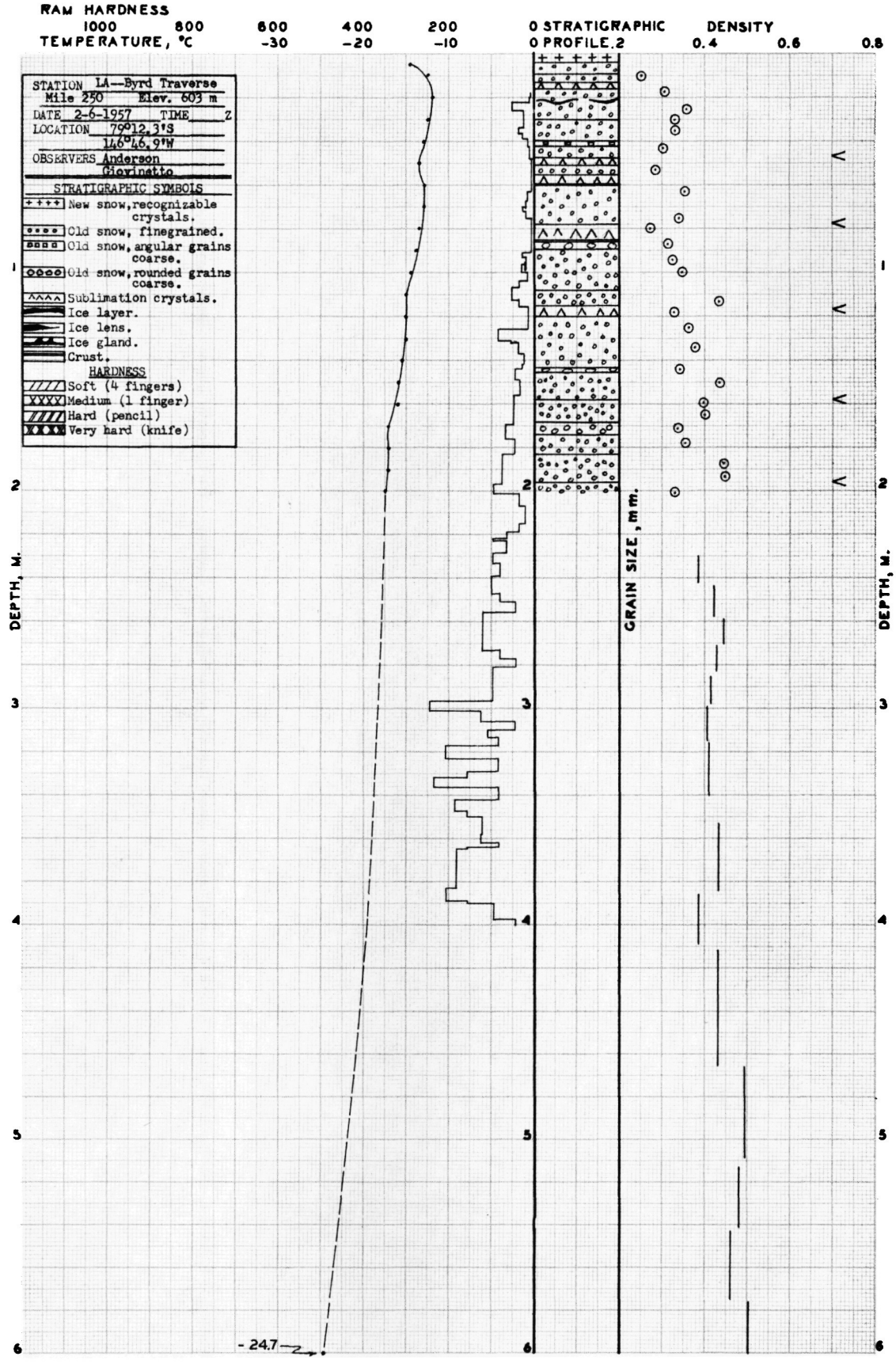
STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
0 - 4.0	1.0	New snow, capped columns; wet
4.0- 7.0	1.0	Small columns in clusters, wet
7.0- 7.5	1.5	Clusters of capped columns slightly larger than those on surface
7.5- 9.5	1.0	Small columns in clusters
9.5- 11.0	2.0	Clusters of capped columns
11.0- 20.0	1.0	Irregular and granular crystals
20.0		Thin crust, 2 mm
20.0- 25.5	2.0	Fairly loose; granular and irregular crystals
25.5- 33.0	1.0-2.0	Irregular and some dendritic crystals
33.0- 36.0	1.0	Compact, dendritic crystals
36.0- 39.0	2.0-4.0	Layer containing large plates in clusters
39.0		Thin horizon of ice
39.0- 43.0	2.0	Clusters of columns
43.0- 45.0	1.0	Compact layer containing three thin melt horizons
45.0- 50.0	1.0	Compact, small granules
50.0- 54.0	3.0	Compact, fairly large plates
54.0- 56.0	3.0-5.0	Clusters of large plates
56.0- 60.0	1.0	Fine grained, very compact
60.0		Very thin melt horizon, 1 mm
60.0- 68.0	1.0-2.0	Compact, some broken capped columns
68.0- 70.0	2.0	Very loose; broken plates
70.0- 84.0	1.0-2.0	Compact, some broken capped columns
84.0- 87.0	4.0	Very loose; large plates
87.0- 90.0	1.0	Very compact
90.0		2 mm horizon of clear ice containing air pockets
90.0-120.0	1.0	Compact, small rounded granules
120.0		5 mm crust
120.0-135.0	1.0	Compact
135.0-157.0	2.0-3.0	Sublimation layer, capped columns
157.0-163.0	1.0	Compact
163.0-171.0	1.0-2.0	Loose; capped columns
171.0-194.0	1.0	Very compact
194.0-200.0	3.0	Very loose; columns
198.0		Thin crust, 2 mm
200.0-207.0	1.0	Fairly loose; columns
207.0-210.0	1.0	Compact
210.0		Pit bottom

RAM HARDNESS DATA SHEET

Station LA--Byrd Traverse
Observers Anderson, Giovinetto

Depth cm	Hardness Number, Kg
Mile 220	
5 February 1957	
0- 12	
12- 14	7
14- 15	22
15- 16	52
16- 21	12
21- 24	18
24- 27	18
27- 31	15
31- 35	15
35- 37	27
37- 41	15
41- 44	18
44- 47	18
47- 50	18
50- 58	8
58- 63	12
63- 66	18
66- 73	9
73- 85	6
85- 87	27
87- 90	69
90- 96	53
96- 97	53
97-101	28
101-105	28
105-114	20
114-125	17
125-140	33
140-143	19
143-171	57
171-183	53
183-187	43
187-196	23
196-205	23
205-217	142
217-220	56
220-226	56
226-230	43
230-235	36
235-250	106
250-257	156
257-262	36
262-268	81
268-273	126
273-282	56
282-291	123
291-300	90
300-304	82
304-318	195
318-328	112
328-339	116
339-344	127
344-370	238
370-373	157
373-387	50
387-389	82
389-392	157
392-398	57
398-400	157
Mile 240	
5 February 1957	
0- 17	
17- 19	12
19- 23	15
23- 24	52
24- 26	27
26- 30	27
30- 37	23
37- 42	32
42- 50	21
50- 55	12
55- 67	6
67- 74	9
74- 84	22
84- 89	22
89-101	6
101-105	15
105-113	22
113-126	26
126-138	53
138-141	19
141-145	15
145-175	45
175-179	53
179-194	50
194-196	81
196-201	36
201-208	27
208-213	66
213-220	27
220-222	81
222-229	27
229-238	73
238-243	96
243-248	186
248-254	106
254-256	156
256-263	92
263-274	456
274-281	135
281-287	106
287-294	27
294-297	107
297-300	57
300-303	57
303-305	157
305-312	221
312-317	157
317-321	82
321-329	63
329-353	269
353-361	176
361-372	225
372-374	232
374-383	107
383-394	280
394-400	232


RAM HARDNESS
1000 800 600 400 200
TEMPERATURE, °C -30 -20 -10
0 STRATIGRAPHIC
0 PROFILE.2
DENSITY
0.4 0.6 0.8
STATION LA--Byrd Traverse
Mile 250 Elev. 603 m
DATE 2-6-1957 TIME Z
LOCATION 79°12.3'S
146°46.9'W
OBSERVERS Anderson
Giovinetto
STRATIGRAPHIC SYMBOLS
New snow, recognizable crystals.
Old snow, finegrained.
Old snow, angular grains coarse.
Old snow, rounded grains coarse.
Sublimation crystals.
Ice layer.
Ice lens.
Ice gland.
Crust.
HARDNESS
Soft (4 fingers)
Medium (1 finger)
Hard (pencil)
Very hard (knife)
DEPTH, M.
GRAIN SIZE, mm.
- 24.7

LA-Byrd Traverse
Station Mile 250
Date 6 February 1957
Observers Anderson, Giovinetto

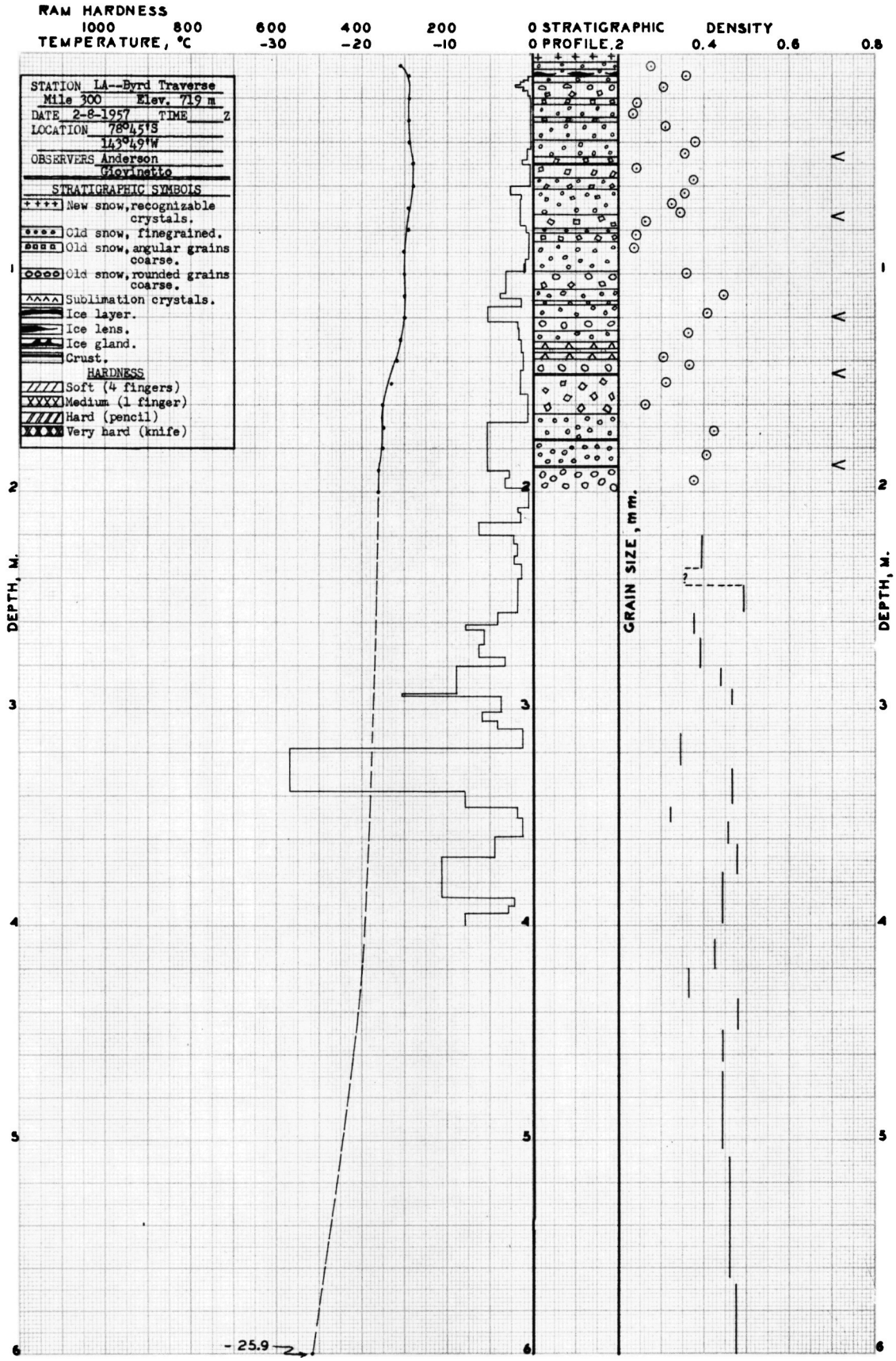
STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
1- 4	1.0	New snow, wet, dendritic
4- 9	1.0	New snow, slightly compacted dendrites with thin discontinuous lenses of irregular crystals
9- 13	.5	Compact; small irregular crystals
13- 16	2.0-3.0	Very loose; capped columns and irregular crystals; sublimation zone
16- 30	1.0	Compact, granular
21		Wavy, thin (1 mm) discontinuous melt horizon
30- 40	1.0	Slightly compact; irregular crystals in clusters
40- 42	2.0	Loose; granular
42- 43	.5-1.0	Compact--variable thickness
43- 44	2.0	Loose--variable thickness
44- 47	.5-1.0	Compact--variable thickness
47- 51	2.0-4.0	Very loose; stellars and needles, sublimation zone
51- 55	.5-1.0	Compact, granular
55- 60	2.0-4.0	Very loose; columns and irregular crystals, sublimation zone
60		Thin (2 mm) continuous melt horizon
60- 78	1.0-1.5	Compact granules; less compaction towards base
78- 85	3.0-4.0	Very loose, columns and needles, sublimation zone
85		Thin (2 mm) melt horizon
85- 87	1.0-1.5	Compact, granular
87- 89	3.0	Soft, granular
89-108	1.0-2.0	Compact, granular
108-117	1.0-2.0	Very compact
117-120	3.0-5.0	Very loose--thickness varies, sublimation zone
120-143	1.0-2.0	Compact, granular
143-145	2.0-4.0	Loose; granular
145-158	1.0-2.0	Very compact
158-159	2.0-3.0	Loose; granular
159-168	1.0-2.0	Very compact
168-174	1.0-2.0	Loose--very compact layer of variable thickness (1 - 2 cms) contained within the loose layer
174-183	1.0-2.0	Compact, granular
183-196	1.0	Very compact
196-200	1.0-2.0	Fairly loose; granular
200		Pit bottom

RAM HARDNESS DATA SHEET

Station LA--Byrd Traverse
Observers Anderson, Giovinetto

Depth cm	Hardness Number, Kg
Mile 260	
7 February 1957	
0- 11	
11- 13	7
13- 16	5
16- 33	3
33- 36	5
36- 38	17
38- 46	6
46- 48	17
48- 58	7
58- 63	12
63- 65	27
65- 67	27
67- 70	18
70- 88	5
88- 91	19
91- 93	28
93-104	103
104-106	28
106-118	7
118-123	23
123-128	63
128-132	28
132-140	153
140-144	65
144-148	40
148-154	61
154-159	33
159-163	15
163-165	53
165-169	40
169-174	43
174-189	93
189-192	16
192-194	21
194-195	36
195-200	24
200-204	29
204-206	96
206-210	81
210-215	66
215-220	96
220-224	118
224-230	131
230-239	89
239-250	156
250-258	100
258-268	51
268-278	81
278-279	307
279-281	232
281-285	44
285-289	44
289-293	119
293-299	82
299-304	67
304-317	180
317-318	307
318-335	192
335-340	97
340-355	157
355-358	57
358-364	157
364-367	57
367-372	67
372-377	97
377-389	57
389-393	44
393-401	176
Mile 280	
7 February 1957	
0- 10	
10- 13	5
13- 20	3
20- 24	37
24- 31	12
31- 33	17
33- 38	8
38- 49	5
49- 55	7
55- 56	32
56- 61	32
61- 70	19
70- 84	38
84- 90	28
90- 95	43
95- 98	19
98-101	19
101-109	9
109-122	7
122-130	53
130-138	40
138-147	75
147-154	17
154-156	28
156-158	28
158-160	28
160-166	70
166-169	19
169-172	36
172-175	36
175-177	36
177-185	83
185-188	36
188-198	15
198-205	27
205-207	81
207-210	106
210-214	81
214-218	43
218-220	81
220-223	56
223-227	81
227-232	66
232-235	156
235-241	31
241-247	31
247-254	71
254-265	47
265-286	63
286-291	67
291-295	82
295-299	82
299-305	82
305-314	157
314-320	107
320-325	97
325-329	44
329-348	197
348-358	82
358-366	194
366-368	82
368-371	57
371-377	57
377-383	57
383-389	57
389-395	107
395-400	157


RAM HARDNESS
1000 800 600 400 200 0
TEMPERATURE, °C -30 -20 -10
STRATIGRAPHIC PROFILE.2
DENSITY 0.4 0.6 0.8
STATION LA--Byrd Traverse
Mile 300 Elev. 719 m
DATE 2-8-1957 TIME Z
LOCATION 78°45'S
143°49'W
OBSERVERS Anderson
Giovinetto
STRATIGRAPHIC SYMBOLS
New snow, recognizable crystals.
Old snow, finegrained.
Old snow, angular grains coarse.
Old snow, rounded grains coarse.
Sublimation crystals.
Ice layer.
Ice lens.
Ice gland.
Crust.
HARDNESS
Soft (4 fingers)
Medium (1 finger)
Hard (pencil)
Very hard (knife)
DEPTH, M.
GRAIN SIZE, mm.
-25.9

LA-Byrd Traverse
Station Mile 300
Date 8 February 1957
Observers Anderson, Giovinetto

STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
0- 1	2.0	New snow, plates
1- 2	1.0	Wet--irregular crystals
2- 3	1.0	Slightly compact; wet
3- 6	1.0	Compact, granular
6- 7	1.0-3.0	Very loose; plates and capped columns
7- 8	1.0	Very compact
8- 10		Intermittent ice lenses
10- 13	1.0	Compact, granular
13- 20	1.0-2.0	Loose; fairly large granules increasing in size towards base
20- 23	1.0-3.0	Very loose; plates and capped columns
23- 29	1.0-2.0	Fairly compact; granular
29- 31	2.0	Very loose; columns
31- 39	1.0-1.5	Fairly compact; dry, sugary
39- 47	1.0	Compact, granular
47- 56	1.5-2.5	Loose; dendrites and capped columns
50		2 mm crust
56- 60	1.0-1.5	Compact, granular
60- 61	2.0-4.0	Very loose; columns and needles--sublimation crystals
61- 64	1.0	Compact, dry, granular
64- 66	1.0-3.0	Loose; columns and needles--sublimation zone
66- 74	1.0	Compact; dry, granular
74- 79	2.0-3.0	Loose columns and capped columns
79- 81	1.0	Compact, granular
81- 85	2.0-3.0	Loose; needles and capped columns--sublimation zone
85- 99	.5	Very compact
99-107	1.0-2.0	Capped columns and dendrites increasing in size and looseness with depth
107-112	1.0	Very compact; broken columns
112-114	1.0-1.5	Loose; granular
114-120	1.0	Very compact; broken columns
120-126	1.0-2.0	Loose; granular
126-131	1.0	Fairly compact; granular
131-134	2.0-3.0	Broken plates and capped columns, soft and loose, sublimation zone
134-136	1.0	Fairly compact; granular
136-139	2.0-3.0	Capped columns and irregular crystals--very loose, sublimation zone
139-146	1.0-1.5	Fairly loose; looseness and granule size decreasing toward base
146		2 mm crust
146-164	1.0-3.0	Dendrites and irregular crystals showing appreciable increase in size with depth

STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size,mm	Remarks
164-176	1.0	Compact, granular
176		2 mm crust
176-188	1.5	Fairly compact; granular
188		2 mm crust
188-200	1.0-2.0	Variable compaction within layer
200		Bottom of pit

RAM HARDNESS DATA SHEET

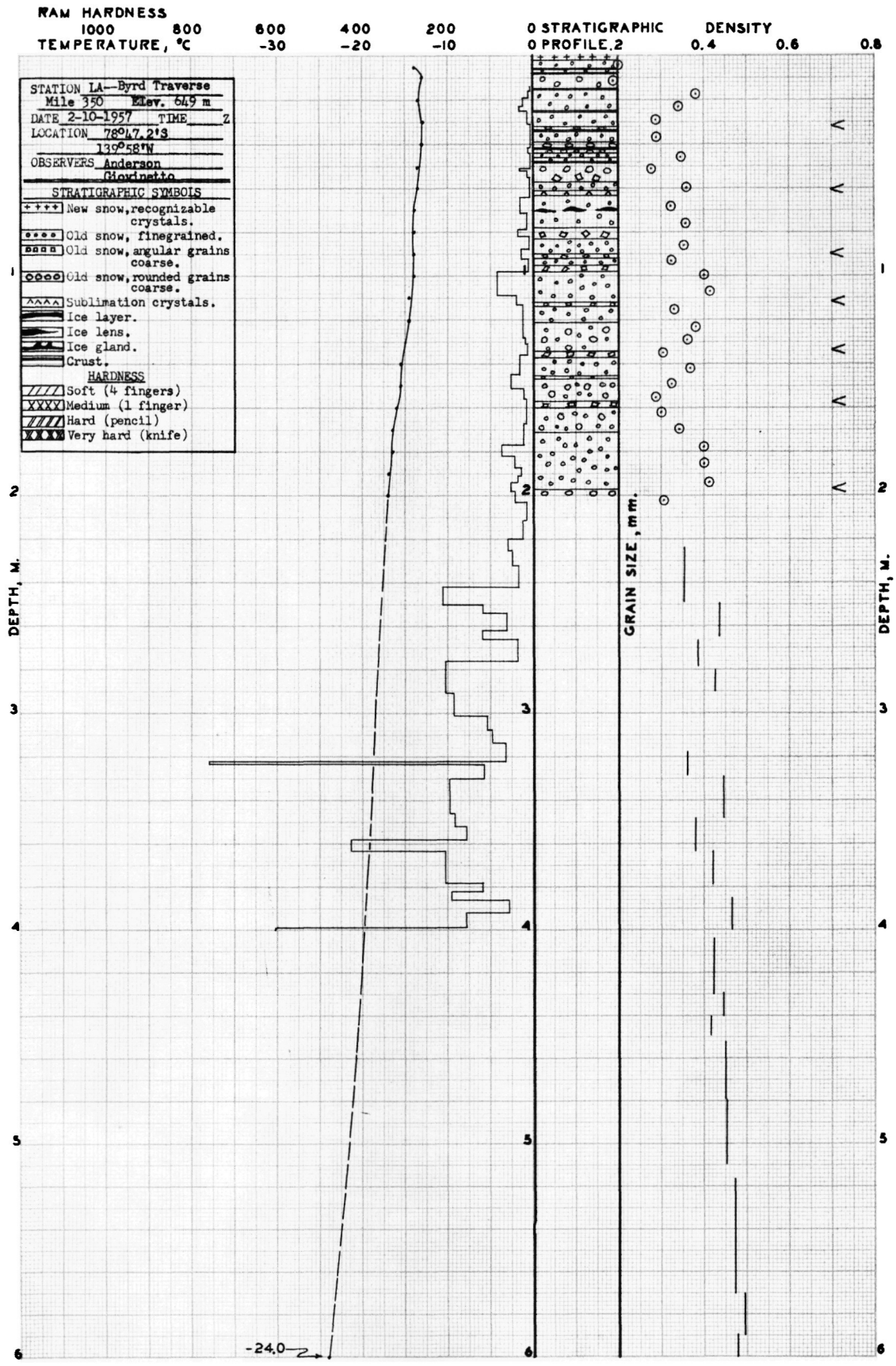
Station LA--Byrd Traverse
Observers Anderson, Giovinetto

Depth cm	Hardness Number, Kg
Mile 320	
9 February 1957	
0- 4	
4- 11	32
11- 15	52
15- 16	32
16- 18	17
18- 21	12
21- 23	17
23- 24	32
24- 26	17
26- 27	32
27- 31	15
31- 36	22
36- 53	5
53- 64	11
64- 69	82
69- 71	27
71- 75	15
75- 86	75
86- 89	35
89-105	8
105-109	27
109-116	24
116-125	14
125-132	17
132-138	20
138-147	70
147-152	43
152-161	9
161-164	36
164-170	70
170-173	70
173-177	115
177-186	47
186-191	84
191-203	81
203-208	42
208-213	42
213-220	45
220-225	78
225-230	24
230-235	24
235-238	36
238-240	96
240-249	123
249-254	96
254-261	70
261-266	66
266-275	206
275-281	106
281-287	131
287-290	157
290-295	97
295-298	157
298-302	40
302-307	37
307-310	57
310-312	157
312-317	97
317-320	57
320-324	44
324-330	32
330-334	82
334-338	82
338-345	178
345-350	157
350-354	232
354-357	57
357-360	57
360-367	157
367-370	57
370-374	157
374-383	340
383-385	157
385-390	67
390-398	157
398-400	82
Mile 340	
9 February 1957	
0- 13	
13- 14	12
14- 16	7
16- 17	22
17- 18	32
18- 20	17
20- 24	10
24- 35	5
35- 45	5
45- 48	12
48- 58	5
58- 60	32
60- 69	24
69- 77	27
77- 80	18
80- 87	9
87- 89	27
89- 94	23
94- 99	23
99-104	23
104-108	28
108-112	28
112-117	13
117-121	15
121-129	15
129-138	25
138-143	13
143-151	9
151-165	28
165-171	61
171-176	33
176-182	11
182-188	21
188-191	96
191-196	60
196-200	73
200-204	28
204-213	16
213-219	21
219-229	33
229-234	36
234-238	43
238-240	81
240-248	25
248-262	24
262-270	100
270-275	36
275-280	96
280-284	43
284-293	24
293-296	157
296-300	119
300-304	44
304-313	24
313-320	28
320-325	97
325-328	57
328-333	67
333-338	67
338-347	74

RAM HARDNESS DATA SHEET

Station LA--Byrd Traverse
Observers Anderson, Giovinetto

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
347-353	57				
353-360	114				
360-362	82				
362-366	44				
366-369	57				
369-382	111				
382-388	57				
388-390	82				
390-396	32				
396-400	119				


RAM HARDNESS
1000
800
TEMPERATURE, °C
600
-30
400
-20
200
-10
0 STRATIGRAPHIC
0 PROFILE 2
DENSITY
0.4
0.6
0.8
STATION LA--Byrd Traverse
Mile 350 Elev. 649 m
DATE 2-10-1957 TIME Z
LOCATION 78°47.2'S
139°58'W
OBSERVERS Anderson
Giovinetto
STRATIGRAPHIC SYMBOLS
New snow, recognizable crystals.
Old snow, finegrained.
Old snow, angular grains coarse.
Old snow, rounded grains coarse.
Sublimation crystals.
Ice layer.
Ice lens.
Ice gland.
Crust.
HARDNESS
Soft (4 fingers)
Medium (1 finger)
Hard (pencil)
Very hard (knife)
DEPTH, M.
GRAIN SIZE, mm.
-24.0
1
2
3
4
5
6

LA-Byrd Traverse
Station Mile 350
Date 10 February 1957
Observers Anderson, Giovinetto

STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
0- 2	1.0	New snow, slightly wet, spatial dendritic crystals
2- 6	1.0	Slightly compact, wet, new snow
6	1.0	Very thin (4 mm) horizon slightly more compact than above layer
6- 8	1.0	Slightly compact, wet, new snow
8		Identical to layer at 6 cms depth
8- 15	1.0-3.0	Very loose; granular, large air pockets between 11 and 12 cms, snow becomes firmer in either direction from this air pocket horizon
15		Two very thin melt horizons
15- 17	.5-1.0	Compact, grading downward into a less compact zone of slightly larger grains (1-1.5 mm) terminating at a depth of 25 cms
25		Thin melt horizon
25- 32	1.0-1.5	Fairly loose, granular, and slightly wet
32- 34	2.0-3.0	Very loose; granular and wet
34		Thin melt horizon
34- 39	1.0-1.5	Fairly loose; granular
39- 42	2.0-3.0	Irregular crystals, very loose and slightly wet
42		2 mm melt horizon
42- 44	1.0-2.0	Quite loose; granular
44- 46	1.0	Compact; granular
46- 48	1.0-2.0	Fairly loose; granular
48		Thin melt horizon
48- 57	2.0-4.0	Loose to very loose with air pockets at base; capped columns and columns
57- 61	1.0-2.0	Very compact
61- 63	4.0	Very loose; sublimation zone, columns and capped columns
63- 78		Fairly loose; ice lenses up to 1 cm thick at depth of 70 cms
78- 83	2.0-4.0	Very loose; broken columns
83- 90	1.0	Compact, granular
90- 92	2.0-3.0	Very loose; broken columns
92- 95	1.0	Compact, granular
95- 98	2.0-3.0	Very loose; broken columns
98-112	1.0	Very compact
112-114	2.0-3.0	Very loose, granules and broken columns
114-121	1.0-1.5	Slightly loose; granular
121-122	1.0-2.0	Loose; granular
122-124	1.0-1.5	Fairly loose; granular
124-126	1.0-2.0	Loose; granular
126-131	1.0-1.5	Fairly loose; granular
131-132	1.0-2.0	Loose; granular

Station LA-Byrd Traverse Mile 350 (Continued)

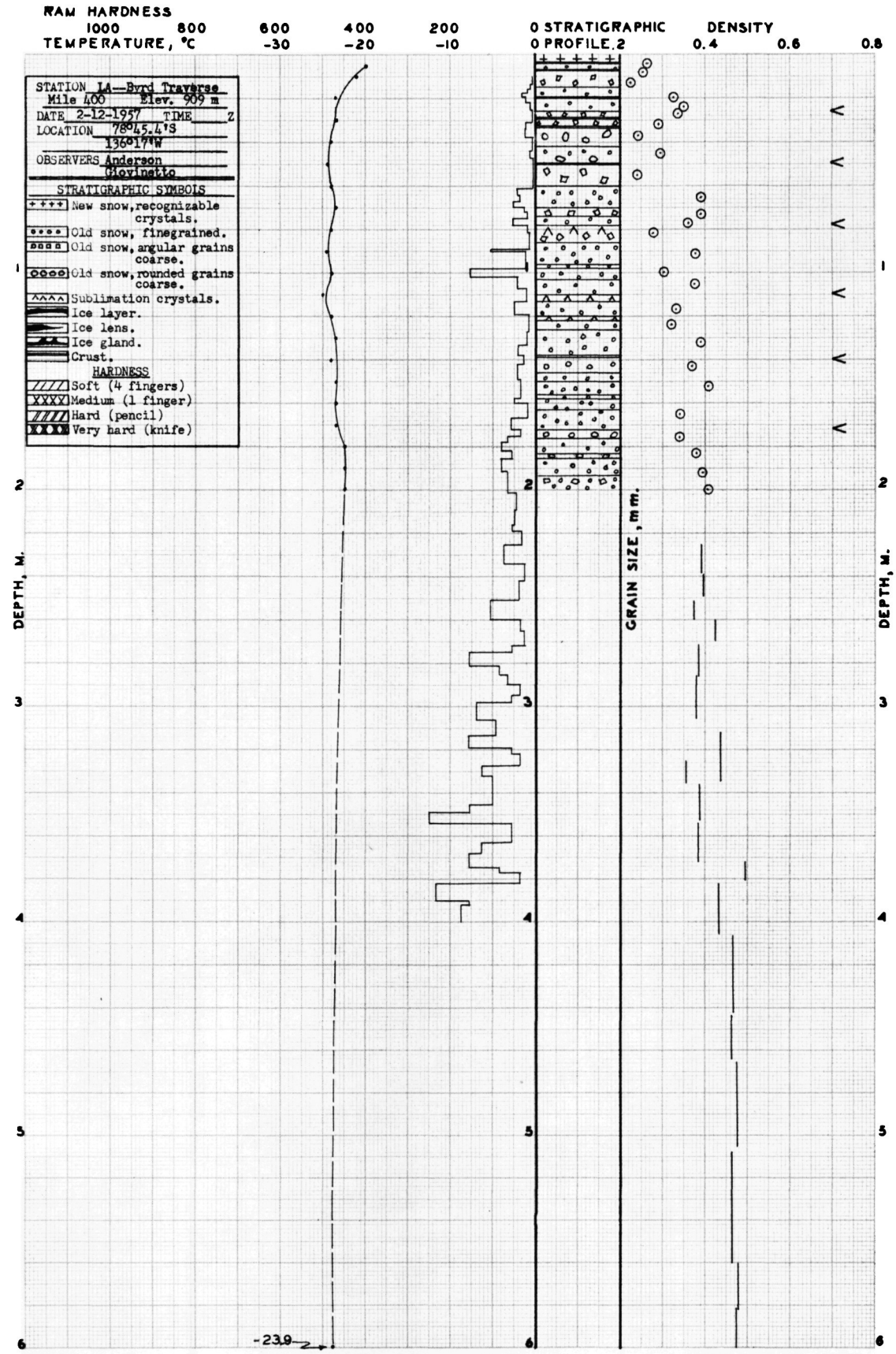
STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
132-134	1.0-1.5	Fairly loose; granular
134-137	1.0-3.0	Loose; granules and broken columns
137-145	1.0-1.5	Fairly loose; granular
145-147	1.0	Very compact
147-157	1.0-2.0	Loose; granular
157-160	2.0-4.0	Very loose; granular
160-171	1.0-2.0	Loose; granular
171-197	.5-1.0	Very compact
197-204	1.0-3.0	Loose; granular
204		Pit bottom

RAM HARDNESS DATA SHEET

Station LA--Byrd Traverse
Observers Anderson, Giovinetto

Depth cm	Hardness Number, Kg
Mile 360	
11 February 1957	
0- 10	
10- 16	4
16- 20	29
20- 22	17
22- 32	5
32- 36	17
36- 42	19
42- 44	52
44- 51	9
51- 53	27
53- 61	8
61- 66	22
66- 76	7
76- 78	27
78- 87	8
87- 96	20
96-100	15
100-103	36
103-104	153
104-109	33
109-114	33
114-120	20
120-127	24
127-134	53
134-138	15
138-144	28
144-151	17
151-158	39
158-163	103
163-173	58
173-180	53
180-183	19
183-186	16
186-189	16
189-192	36
192-195	66
195-198	36
198-205	19
205-215	15
215-218	36
218-224	81
224-227	36
227-234	19
234-243	226
243-245	82
245-256	29
256-261	36
261-267	31
267-280	18
280-283	56
283-289	131
289-295	31
295-302	28
302-308	32
308-314	132
314-320	82
320-324	45
324-327	107
327-329	82
329-332	57
332-337	97
337-341	82
341-348	93
348-352	45
352-356	295
356-363	178
363-367	45
367-371	45
371-375	45
375-379	119
379-384	127
384-391	50
391-400	174
Mile 380	
11 February 1957	
0- 9	
9- 15	4
15- 17	62
17- 18	152
18- 20	17
20- 23	22
23- 25	32
25- 28	52
28- 36	21
36- 47	7
47- 51	15
51- 55	52
55- 64	19
64- 72	8
72- 78	35
78- 82	15
82- 87	12
87- 90	53
90-100	18
100-105	53
105-109	85
109-114	83
114-119	73
119-122	36
122-128	36
128-139	44
139-146	39
146-152	36
152-158	69
158-160	28
160-164	16
164-176	36
176-179	19
179-184	78
184-188	28
188-194	126
194-202	40
202-208	51
208-222	231
222-225	56
225-230	36
230-242	31
242-247	36
247-268	270
268-273	156
273-279	306
279-283	194
283-290	71
290-310	232
310-315	97
315-318	357
318-325	350
325-330	97
330-339	90
339-348	74
348-352	40
352-360	82
360-363	207
363-374	171
374-380	82
380-385	157
385-391	257
391-400	257


RAM HARDNESS
1000
800
TEMPERATURE, °C
600
-30
400
-20
200
-10
0 STRATIGRAPHIC
0 PROFILE 2
DENSITY
0.4
0.6
0.8
STATION LA—Byrd Traverse
Mile 400 Elev. 909 m
DATE 2-12-1957 TIME Z
LOCATION 78°45.4'S
136°17'W
OBSERVERS Anderson
Giovinetto
STRATIGRAPHIC SYMBOLS
New snow, recognizable crystals.
Old snow, finegrained.
Old snow, angular grains coarse.
Old snow, rounded grains coarse.
Sublimation crystals.
Ice layer.
Ice lens.
Ice gland.
Crust.
HARDNESS
Soft (4 fingers)
Medium (1 finger)
Hard (pencil)
Very hard (knife)
DEPTH, M.
GRAIN SIZE, mm.
-23.9
1
2
3
4
5
6

LA-Byrd Traverse
Station Mile 400
Date 12 February 1957
Observers Anderson, Giovinetto

STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
0 - .5	1.0	Fresh snow, wet, containing some capped columns
.5- 2.0	1.0-1.5	New snow, wet, capped columns
2.0- 4.0	1.5	New snow, needles, starting compaction
4.0- 4.3		3 mm melt horizon
4.3- 7.0	1.0	Wet, irregular shaped snow grains
7.0- 7.3		3 mm melt horizon
7.3- 11.0	1.5	Spatial dendrites and irregular crystals
11.0- 12.0	1.5	Loose; capped columns
12.0- 13.0	1.5	Spatial dendrites and irregular crystals
13.0- 15.0	2.0	Quite loose; plates and capped columns
15.0- 20.0	.5-1.5	Layer of variable compaction 15-17 grain size .5 17-18 grain size 1.0 18-20 grain size 1.5 Thin melt horizons at 17, 18 and 20
20.0- 26.0	.5-1.5	Size of granules decreases with depth; more compact towards base
26.0- 29.0	1.0-2.0	Soft clusters of columns
29.0		Melt horizon
29.0- 33.0	1.0-2.0	Soft, loose; clusters of columns
33.0		Thin melt horizon
33.0- 36.0	1.0-1.5	Fairly loose; granular
36.0- 37.0	1.0-2.5	Very loose; capped columns
37.0- 39.0	1.0-1.5	Fairly loose; granular
39.0- 42.0	3.0	Very loose; plates and capped columns
42.0- 48.0	1.0-2.0	Crystal size and looseness increases with depth
48.0		2 mm melt horizon
48.0- 50.0	1.0-2.0	Loose, some spatial dendrites
50.0		2 mm melt horizon
50.0- 60.0	1.5-3.0	Columns and needles alternating horizons of loose to fairly loose snow; crystal size increases with depth
60.0- 70.0	1.0	Compact, granular
70.0- 74.0	1.0-2.0	Fairly loose; broken columns
74.0- 78.0	1.0	Compact, granular
78.0- 86.0	2.0-3.0	Very loose; columns and capped columns; 79-80 contains air pockets, sublimation horizon; grain size and looseness decrease with depth
86.0- 96.0	.5-1.0	Compact with thin, harder horizons evident
96.0- 98.0	.5	Very compact, granular
98.0-103.0	1.5-2.0	Fairly loose; irregular crystal shapes
103.0-110.0	.5-1.5	Fairly compact; granular
110.0-126.0	1.0-2.0	Fairly compact; capped columns, sublimation features from 110-113 and 120-122

Station LA-Byrd Traverse Mile 400 (Continued)

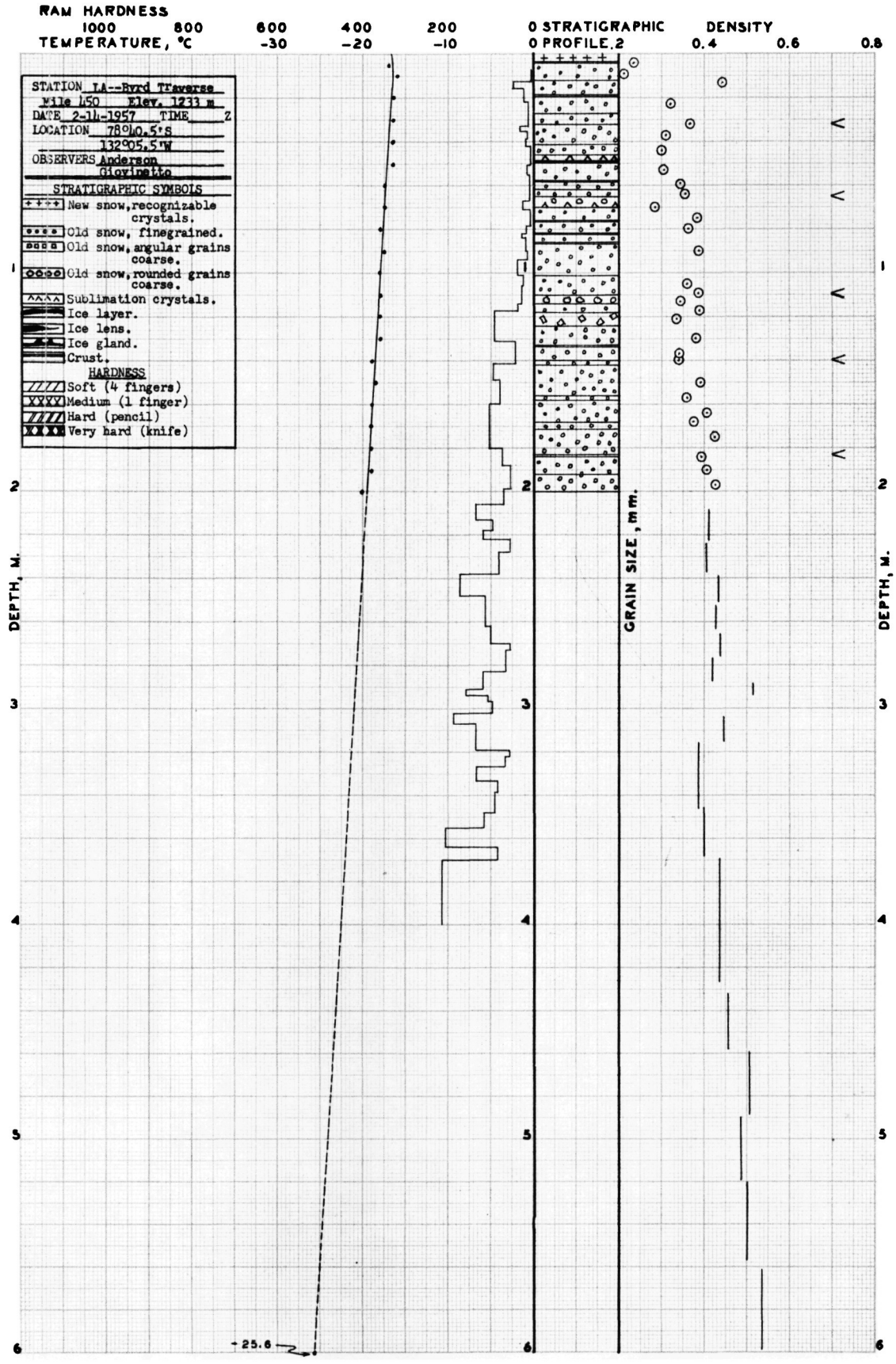
STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
126.0-138.0	1.0	Compact, granular
138.0		Very thin melt horizon
138.0-140.0	1.0	Compact, granular
140.0-146.0	1.0-1.5	Looser than above layer; some dendritic and irregular crystals
146.0-150.0	1.0	Compact, granular
150.0-151.0	1.0-1.5	Same as layer 140-146
151.0-156.0	1.0	Fairly compact; granular
156.0-158.0	1.0-1.5	Fairly loose; granular
158.0-163.0	1.0-2.0	Fairly compact; granular
163.0-172.0	1.0	Layer of differential compaction--softer and harder spots
172.0-176.0	1.5-2.5	Loose, capped columns and irregular crystals
176.0-183.0	1.0	Compact, granular
183.0-185.0	1.5-2.0	Loose, spatial dendrites
185.0-188.0	1.0-1.5	Compact, granular
188.0-189.0	1.5-2.0	Loose, spatial dendrites
189.0-191.0	Less than .5-1.0	Very compact
191.0-193.0	Less than .5	Very compact and fine grained
193.0-200.0	1.0-3.0	Capped columns and irregular crystals, differential compaction; crystal size and looseness decreases towards base
200.0		Pit bottom

RAM HARDNESS DATA SHEET

Station LA--Byrd Traverse
Observers Anderson, Giovinetto

Depth cm	Hardness Number, Kg
Mile 420	
13 February 1957	
0- 10	
10- 13	5
13- 14	12
14- 17	5
17- 23	32
23- 27	17
27- 28	32
28- 32	17
32- 35	18
35- 41	10
41- 49	15
49- 52	35
52- 58	10
58- 65	9
65- 69	27
69- 72	18
72- 76	28
76- 81	63
81- 87	28
87- 90	19
90- 91	53
91- 97	53
97-103	11
103-108	103
108-113	33
113-119	20
119-125	20
125-132	18
132-134	50
134-137	95
137-141	50
141-145	27
145-150	41
150-155	35
155-159	42
159-163	42
163-170	48
170-175	35
175-180	95
180-185	65
185-193	61
193-197	81
197-203	81
203-210	70
210-217	27
217-222	96
222-227	96
227-238	47
238-245	156
245-255	51
255-259	29
259-269	21
269-280	101
280-285	36
285-292	114
292-295	57
295-300	97
300-304	44
304-309	37
309-313	157
313-321	82
321-329	82
329-334	37
334-337	57
337-343	207
343-351	195
351-355	45
355-359	82
359-370	280
370-381	212
381-400	251
Mile 440	
13 February 1957	
0- 5	
5- 18	3
18- 20	7
20- 23	18
23- 25	17
25- 27	17
27- 29	17
29- 33	25
33- 36	62
36- 39	62
39- 44	22
44- 48	15
48- 53	12
53- 57	15
57- 65	8
65- 71	18
71- 75	15
75- 83	21
83- 87	15
87- 94	10
94- 97	53
97-103	70
103-108	53
108-113	63
113-116	53
116-121	33
121-127	45
127-132	43
132-137	13
137-142	83
142-146	28
146-148	53
148-152	103
152-162	63
162-170	84
170-182	96
182-186	43
186-190	118
190-195	96
195-198	156
198-203	96
203-208	96
208-213	156
213-218	96
218-225	92
225-230	126
230-235	126
235-238	106
238-244	131
244-261	138
261-272	115
272-280	325
280-290	186
290-298	195
298-311	238
311-318	157
318-323	187
323-333	157
333-343	187
343-359	120
359-374	127
374-381	136
381-385	307
385-392	157
392-400	195


RAM HARDNESS
1000
800
600
400
200
0 STRATIGRAPHIC
DENSITY
TEMPERATURE, °C
-30
-20
-10
0 PROFILE, 2
0.4
0.6
0.8
STATION LA--Byrd Traverse
Mile 450 Elev. 1233 m
DATE 2-14-1957 TIME Z
LOCATION 78°40.5'S
132°05.5'W
OBSERVERS Anderson
Giovinetto
STRATIGRAPHIC SYMBOLS
New snow, recognizable crystals.
Old snow, finegrained.
Old snow, angular grains coarse.
Old snow, rounded grains coarse.
Sublimation crystals.
Ice layer.
Ice lens.
Ice gland.
Crust.
HARDNESS
Soft (4 fingers)
Medium (1 finger)
Hard (pencil)
Very hard (knife)
DEPTH, M.
GRAIN SIZE, mm.
+25.6
1
2
3
4
5
6

LA-Byrd Traverse
Station Mile 450
Date 14 February 1957
Observers Anderson, Giovinetto

STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
0- 2	1.0	New soft wet snow; plates and stellar crystals in clusters
2		2 mm wide air space
2- 4	1.5	Soft wet snow, plates and irregular crystals; many air pockets
4		1 mm thick melt horizon
4- 6	.5-1.0	Soft; irregular shaped grains
6- 9	.5-1.0	Soft; containing 5 to 7 thin crusts
9- 12	.5-1.0	Soft
12- 19	.5	Very hard portion extending from 12 cms to 17 or 18 cms; base of layer irregular, larger grains (1 mm) filling irregularities
19- 27	1.0	Loose; granular
27- 32	.5-1.0	Fairly compact; granular
32- 41	1.0	Loose; granular; thin melt horizons at 32, 34, 37 and 41 cms
41- 46	1.0	Very soft and loose
46- 49	2.0-4.0	Very loose; broken plates and columns; sublimation zone
49		3 mm melt horizon splitting into three very thin layers and then rejoining
49- 58	1.0-1.5	Loose; granular; looser towards base
58		2 mm melt horizon
58- 62	1.0	Loose; granular
62- 65	1.0	Slightly harder than above layer
65- 70	1.5-3.0	Very loose; air spaces at base; sublimation zone
70- 76	.5	Similar to layer 12-19; very hard portions are discontinuous
76		2 mm melt horizon
76- 82	1.0-1.5	Fairly loose; granular
82		2 mm melt horizon
82- 86	1.0-1.5	Fairly loose; granular
86		2 mm melt horizon
86-101	1.0	Compact, granular
101-103	1.0-2.0	Less compact than above
103-104	1.0	Compact, granular
104-106	1.0-2.0	Less compact than above; same as 101-103
106-110	1.0	Compact, granular
110-114	1.0-4.0	Very loose; granular
114-118	.5-1.0	Very compact
118-124	2.0	Loose; some stellar crystals
124-133	1.0-2.0	Fairly compact; granular
133		2 mm melt horizon
133-135	1.0-2.0	Softer than above layer

Station LA-Byrd Traverse Mile 450 (Continued)

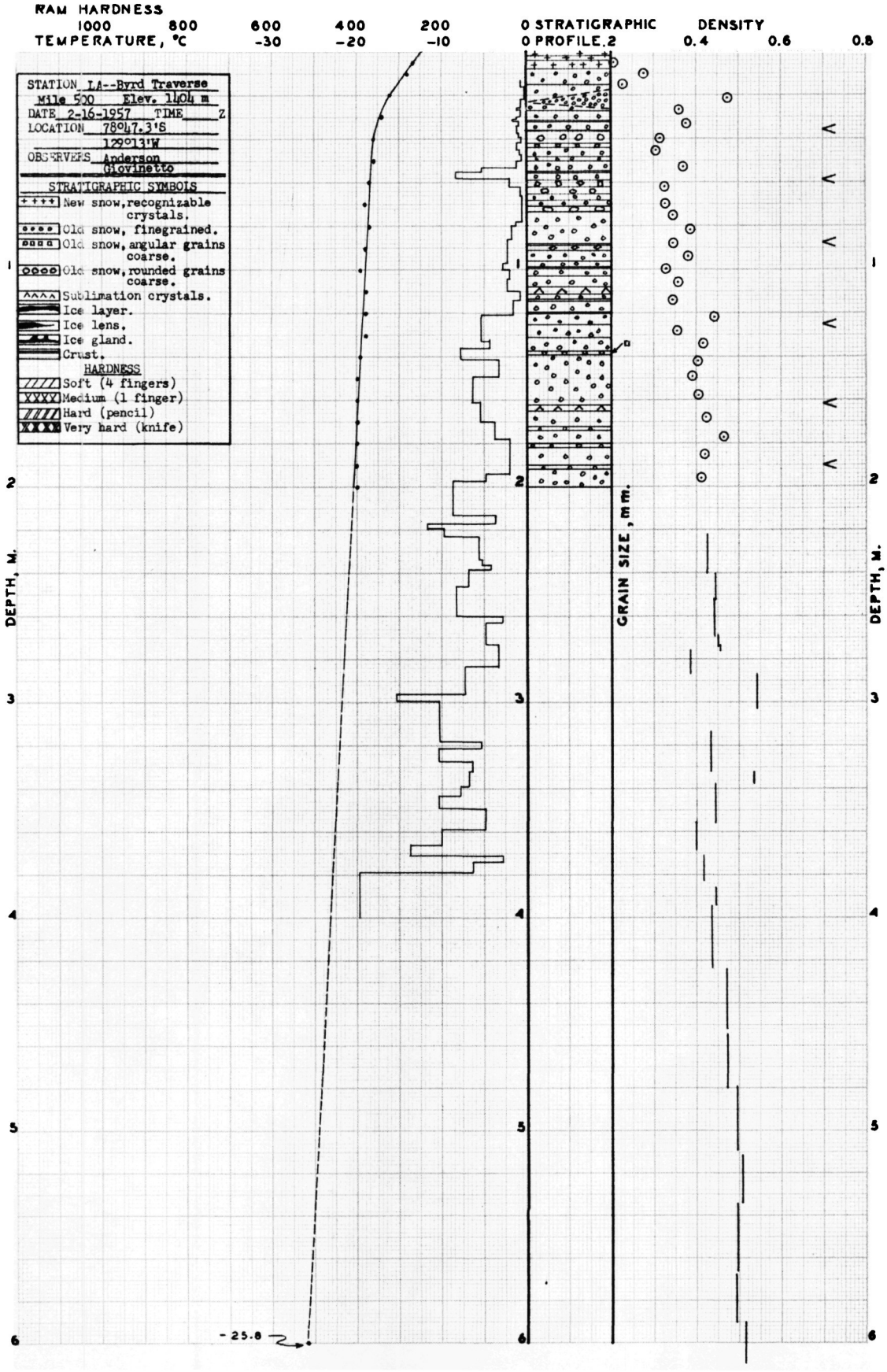
STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
135-140	1.0-2.0	Fairly compact
140-142	1.0-1.5	Loose; granular
142-156	1.0-1.5	Compact
156-158	1.0-2.0	Fairly loose; granular
158-168	1.0-1.5	Compact
168-171	1.0-2.0	Fairly compact; granular
171-183	1.0-1.5	Compact; slightly less so at base
183		1 mm crust
183-192	1.0-1.5	Compact, center portion harder than either top or base
192-200	1.0-1.5	Very compact throughout
200		Pit bottom

RAM HARDNESS DATA SHEET

Station LA--Byrd Traverse
Observers Anderson, Giovinetto

Depth cm	Hardness Number, Kg
Mile 460	
15 February 1957	
0- 8	
8- 12	5
12- 18	4
18- 21	108
21- 24	252
24- 26	52
26- 31	12
31- 40	8
40- 49	8
49- 51	27
51- 55	14
55- 63	8
63- 67	40
67- 75	46
75- 81	35
81- 87	45
87- 93	45
93-100	39
100-106	20
106-109	36
109-113	40
113-122	59
122-134	45
134-144	53
144-147	103
147-160	60
160-171	80
171-178	60
178-182	118
182-186	51
186-191	78
191-199	62
199-206	85
206-210	81
210-215	36
215-224	89
224-233	89
233-240	135
240-244	43
244-260	47
260-265	36
265-269	118
269-284	136
284-292	57
292-295	157
295-305	127
305-313	101
313-318	67
318-324	107
324-332	157
332-352	112
352-360	82
360-369	140
369-375	82
375-384	157
384-388	340
388-400	182
Mile 480	
15 February 1957	
0- 2	
2- 4	7
4- 5	12
5- 8	5
8- 10	7
10- 11	12
11- 12	12
12- 13	12
13- 20	6
20- 24	77
24- 26	17
26- 31	8
31- 39	6
39- 42	12
42- 46	137
46- 50	27
50- 56	18
56- 62	10
62- 65	18
65- 67	27
67- 75	40
75- 85	38
85- 97	40
97- 99	28
99-103	28
103-107	40
107-120	60
120-123	103
123-128	143
128-132	70
132-136	70
136-142	53
142-147	93
147-153	86
153-157	78
157-162	93
162-167	113
167-172	114
172-175	126
175-185	69
185-192	160
192-194	96
194-200	66
200-205	96
205-209	118
209-214	96
214-222	81
222-226	156
226-250	256
250-260	276
260-267	177
267-272	66
272-280	100
280-285	127
285-292	114
292-297	157
297-303	207
303-312	257
312-320	194
320-327	221
327-331	157
331-336	157
336-353	282
353-364	171
364-374	187
374-386	257
386-392	132
392-395	307
395-400	307


RAM HARDNESS
1000
800
600
400
200
0
TEMPERATURE, °C
-30
-20
-10
0 STRATIGRAPHIC PROFILE, 2
DENSITY
0.4
0.6
0.8
STATION LA--Byrd Traverse
Mile 500 Elev. 1404 m
DATE 2-16-1957 TIME Z
LOCATION 78°47.3'S
129°13'W
OBSERVERS Anderson
Giovinetto
STRATIGRAPHIC SYMBOLS
New snow, recognizable crystals.
Old snow, finegrained.
Old snow, angular grains coarse.
Old snow, rounded grains coarse.
Sublimation crystals.
Ice layer.
Ice lens.
Ice gland.
Crust.
HARDNESS
Soft (4 fingers)
Medium (1 finger)
Hard (pencil)
Very hard (knife)
DEPTH, M.
GRAIN SIZE, mm.
- 25.8

LA-Byrd Traverse
Station Mile 500
Date 16 February 1957
Observers Anderson, Giovinetto

STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
0 - 2	1.0	Drift snow starting compaction
2 - 4	1.0-1.5	New snow, needles and irregular crystals
4 - 7	1.0-1.5	Starting compaction
7 - 8	.5-1.0	Capped columns looser than layer above
8 - 15	.5	Slightly compact
15 - 27	.5 and less	Zone of very hard, compact snow of variable thickness (1 cm - 8 cms) very similar to layer 12-19 in previous pit (Mile 450); crystal size is larger (1.5 mm) surrounding the very compact zone
27 - 32	.5-1.0	Slightly compact
32		1 mm crust
32 - 36	.5-1.0	Slightly more compact than above layer (27-32)
36 and 37		2 mm crusts
36 - 42	1.0-1.5	Some broken capped columns
42 - 44	2.0-3.0	Very loose; plates
44 - 48	1.0	Slightly compact; granular
48 - 50	.5-1.0	Slightly more compact than above layer
50 - 59	1.0-1.5	Slightly compact with 1 mm crust at 55
59 - 62	2.0-2.5	Very loose; some capped columns
62 - 65	1.5	Loose; slightly harder than above layer
65 - 68	1.0-2.0	Hardness varies, throughout a series of .5 cm layers, from loose to slightly compact
68 - 71	.5	Compact, granular
71 - 73	3.0	Very loose; plates and capped columns
73 - 79	1.0	Slightly compact; granular
79 - 84	.5	Harder than layer above
84 - 88	1.0	Slightly compact
88		Crust 2 - 3 mm thick
88 - 91	1.0-1.5	Some dendritic crystals
91 - 96	1.0	Slightly compact; granular
96 - 103	1.0-2.5	Slightly loose; granular; thin crust at 99 cms
103 - 108	1.0	Compact, granular
108 - 111	2.5-3.5	Very loose with many air spaces; plates and capped columns visible; sublimation zone
111 - 113	1.0	Compact, granular
113 - 114	1.5-2.5	Loose; irregular crystals
114, 116, 120		Thin crusts
114 - 120	.5-1.5	Columns and dendritic crystals; crystal size and looseness increasing with depth
120 - 125	.5	Very compact
125 - 131	1.0-1.5	Loose, granular
131 - 136	.5	Very compact
136 - 137	.5	Slightly compact
137 - 139	1.0-2.0	Loose; broken capped columns

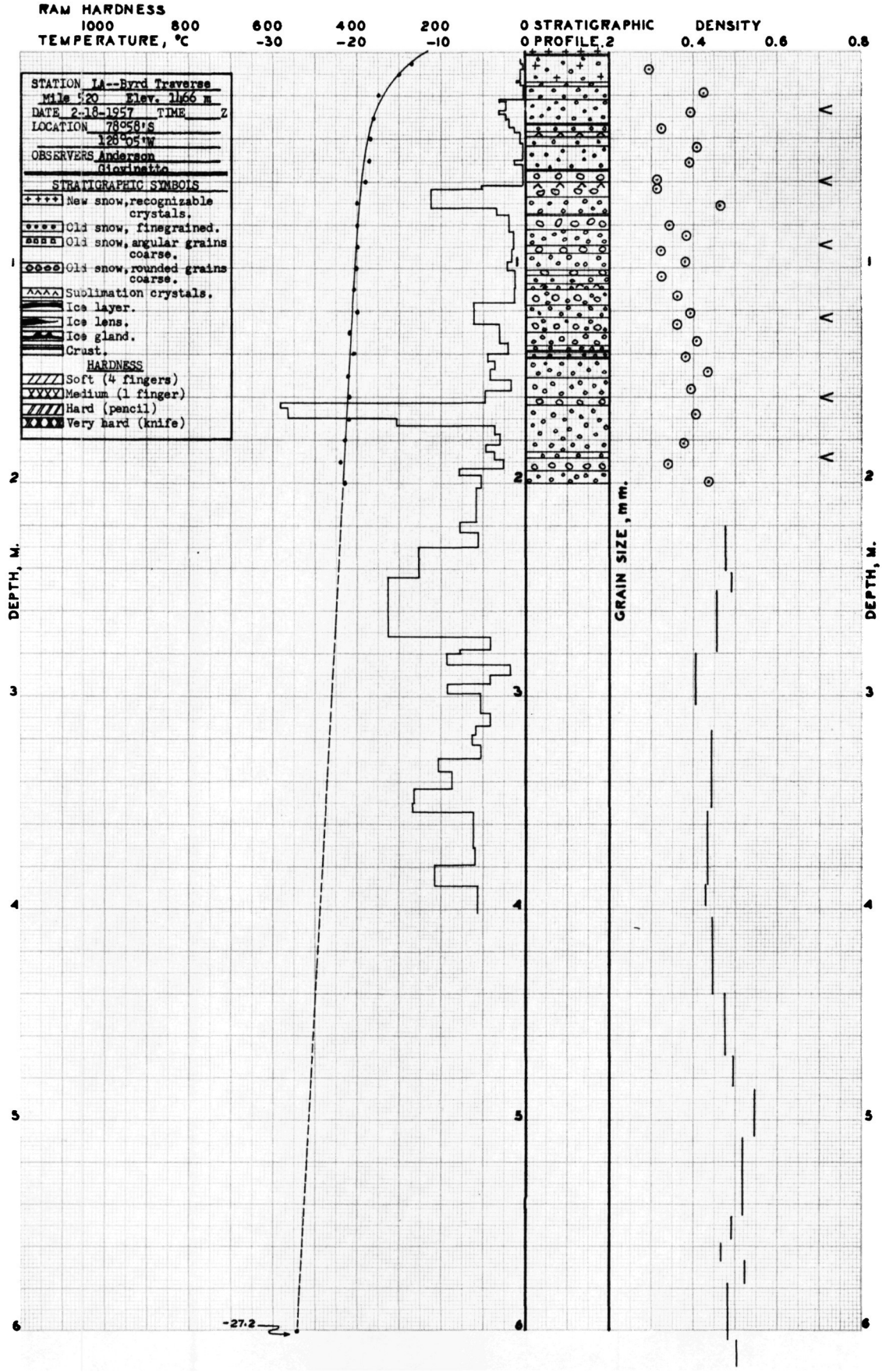
STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
139-162	1.0-1.5	Compact; harder toward base
162-165	1.0-3.0	Loose; broken columns, sublimation zone
165-172	1.0-1.5	Compact
172-173	1.0-2.0	Less compact than layer above
173-180	1.0-1.5	Compact
180-182	1.0-2.0	Less compact than above layer
182-190	1.0-1.5	Compact
190-192	1.0-2.0	Less compact than above layer
192-200	1.0-1.5	Compact
200		Pit bottom

RAM HARDNESS DATA SHEET

Station LA--Byrd Traverse
Observers Anderson, Giovinetto

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Mile 510		185-188	96		
17 February 1957		188-191	156		
0- 8		191-195	118		
8- 9	42	195-198	66		
9- 11	72	198-206	73		
11- 12	62	206-213	83		
12- 14	32	213-219	51		
14- 16	32	219-226	83		
16- 20	17	226-229	156		
20- 23	22	229-237	96		
23- 25	62	237-240	66		
25- 30	402	240-245	96		
30- 35	302	245-251	131		
35- 38	168	251-256	156		
38- 40	102	256-260	193		
40- 43	85	260-268	268		
43- 45	127	268-270	81		
45- 48	218	270-277	113		
48- 55	81	277-280	256		
55- 59	27	280-285	306		
59- 62	19	285-291	382		
62- 65	19	291-293	157		
65- 70	62	293-299	82		
70- 72	52	299-306	71		
72- 76	52	306-312	82		
76- 85	53	312-319	221		
85- 90	33	319-325	207		
90- 95	63	325-329	119		
95- 99	28	329-334	97		
99-103	38	334-337	207		
103-106	53	337-344	650		
106-109	53	344-348	644		
109-114	53	348-355	221		
114-120	36	355-371	165		
120-124	28	371-380	224		
124-128	53	380-387	328		
128-135	46	387-400	134		
135-141	28				
141-144	53				
144-148	65				
148-152	78				
152-159	74				
159-165	61				
165-177	88				
177-180	66				
180-183	66				
183-185	96				


RAM HARDNESS
1000 800 600 400 200
TEMPERATURE, °C -30 -20 -10
0 STRATIGRAPHIC
0 PROFILE 2
DENSITY
0.4 0.6 0.8
STATION LA--Byrd Traverse
Mile 520 Elev. 1166 m
DATE 2-18-1957 TIME Z
LOCATION 78°58'S
128°05'W
OBSERVERS Anderson
Giovinetto
STRATIGRAPHIC SYMBOLS
New snow, recognizable crystals.
Old snow, finegrained.
Old snow, angular grains coarse.
Old snow, rounded grains coarse.
Sublimation crystals.
Ice layer.
Ice lens.
Ice gland.
Crust.
HARDNESS
Soft (4 fingers)
Medium (1 finger)
Hard (pencil)
Very hard (knife)
DEPTH, M.
GRAIN SIZE, mm.
-27.2

LA-Byrd Traverse
Station Mile 520
Date 18 February 1957
Observers Anderson, Giovinetto

STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
0 - 1	1.0	Fresh snow; stellar crystals
1		Thin crust
1 - 14	.5-1.0	Compacted new snow
14 - 16	1.0-1.5	Very soft; irregular crystals
16 - 22	.5 and less	Very hard layer of variable thickness corresponding to similar layers in the two previous pits, at, or about at the same stratigraphic level
22 - 37	.5-1.0	Series of bands, each about 4 cms thick; each band is compact in its upper part grading to a looser and larger grained zone at its base; thin crust at 33 cms
37 - 39	3.0-5.0	Very loose; many air pockets, large plates, sublimation zone
39 - 43	.5	Very compact
43 - 55	1.0-1.5	Fairly loose; granular
54		1 mm crust
55 - 57	2.0	Loose; irregular grains
57 - 60	2.0-3.0	Looser than above layer
60 - 61	3.0-4.0	Very loose; air spaces; not found at a consistent level but fluctuates 5 to 10 cms; plate crystals prominent; sublimation zone
61 - 65	1.0-2.0	Loose; irregular crystals
65 - 67	3.0-5.0	Very loose; broken plates and stellar crystals evident; sublimation zone
67 - 75	.5 and less	Very hard layer of variable thickness; quite similar to layer 16-22 above
75		2 mm crust
75 - 82	1.0-2.0	Soft, granular
82 - 89	1.0	Fairly compact; granular
89 - 93	1.0-2.0	Soft; irregular and granular crystals
93 - 101	1.0	Fairly compact
101 - 103	1.0-2,0	Soft; irregular and granular crystals
103 - 107	1.0	Fairly compact
107 - 108	2.0-4.0	Very loose; broken plates
108 - 110	.5-1.0	Compact
110 - 117	1.0-2.0	Fairly loose; granular
117 - 123	1.0-1.5	Slightly more compact than above
123 - 130	1.0-2.0	Fairly loose; granular
130 - 136	1.0-1.5	Slightly more compact than above; same as 117-123
136 - 143	1.0-1.5	Fairly compact
139 and 141		Thin crusts
143 - 151	1.0-1.5	Very compact
151 - 152		Slightly less compact than above

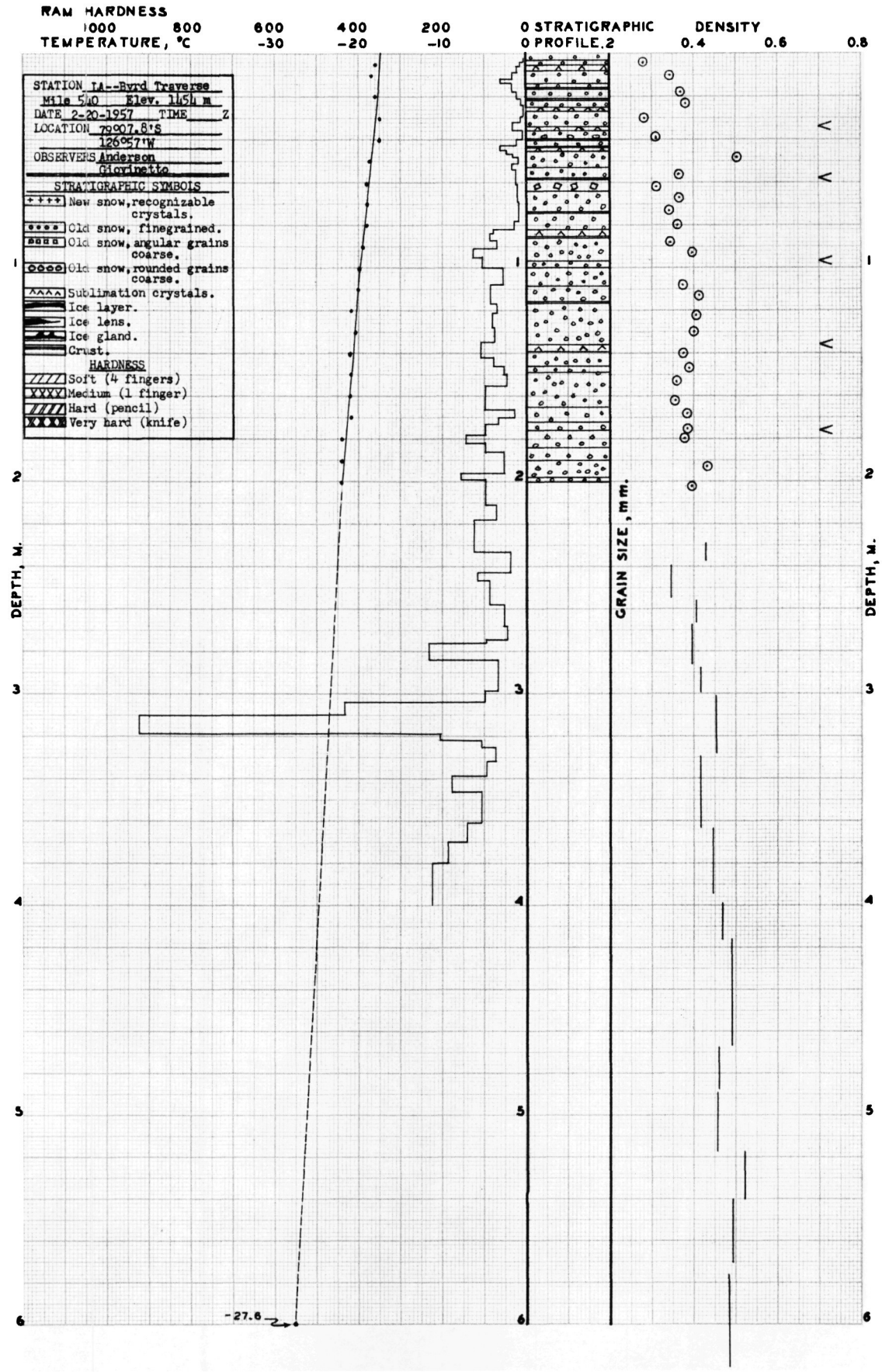
STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
152-155	1.0-1.5	Very compact
155-156		Slightly less compact than above
156-160	1.0-1.5	Compact
160-163	1.0-3.0	Loose; granular
163-185	1.0	Very compact; granular
185-186	2.0	Fairly loose; granular
186-188	1.0	Very compact
188-194	1.0-3.0	Fairly loose; granular
194-200		Very compact
200		Pit bottom

RAM HARDNESS DATA SHEET

Station LA--Byrd Traverse
Observers Anderson, Giovinetto

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Mile 530		232-236	118		
19 February 1957		236-244	118		
0- 1		244-248	156		
1- 2	12	248-260	168		
2- 4	37	260-263	56		
4- 10	59	263-272	89		
10- 14	10	272-277	66		
14- 16	17	277-285	62		
16- 18	17	285-290	97		
18- 21	12	290-293	157		
21- 22	92	293-301	288		
22- 27	62	301-306	97		
27- 34	9	306-316	97		
34- 39	22	316-326	97		
39- 45	10	326-335	107		
45- 49	15	335-340	67		
49- 55	18	340-350	97		
55- 64	24	350-354	157		
64- 69	12	354-361	178		
69- 82	25	361-366	127		
82- 87	23	366-373	264		
87- 92	23	373-378	97		
92- 96	28	378-382	82		
96- 99	36	382-385	207		
99-105	11	385-392	221		
105-112	24	392-400	157		
112-114	103				
114-121	146				
121-125	40				
125-128	53				
128-136	78				
136-145	70				
145-153	47				
153-160	110				
160-170	128				
170-190	75				
190-194	96				
194-197	126				
197-200	126				
200-202	186				
202-204	186				
204-208	141				
208-214	111				
214-221	135				
221-228	122				
228-232	73				


RAM HARDNESS
1000
800
600
400
200
0
TEMPERATURE, °C
-30
-20
-10
0 STRATIGRAPHIC PROFILE.2
DENSITY
0.4
0.6
0.8
STATION LA--Byrd Traverse
Mile 540 Elev. 1454 m
DATE 2-20-1957 TIME Z
LOCATION 79°07.8'S
126°57'W
OBSERVERS Anderson
Giovinetto
STRATIGRAPHIC SYMBOLS
New snow, recognizable crystals.
Old snow, finegrained.
Old snow, angular grains coarse.
Old snow, rounded grains coarse.
Sublimation crystals.
Ice layer.
Ice lens.
Ice gland.
Crust.
HARDNESS
Soft (4 fingers)
Medium (1 finger)
Hard (pencil)
Very hard (knife)
DEPTH, M.
GRAIN SIZE, mm.
-27.6

LA-Byrd Traverse
Station Mile 540
Date 20 February 1957
Observers Anderson, Giovinetto

STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
0- 5	.5	Fairly compact drift snow
5- 8	1.0-2.0	Very loose with much air space; needles and capped columns
8- 10	.5	Fairly compact drift snow
10- 14	.5	Drift snow slightly looser than above
14- 16	1.0	Soft, granular
16		2 mm melt horizon
16- 21	1.0	Slightly compact, granular layer
21		3 mm melt layer, very hard almost clear ice
21- 25	.5-1.0	Intermittent, compact layer
25- 27	2.0-3.0	Very loose; capped columns, suggest a sublimation zone
27- 30	1.0	Slightly compact; granular
30- 34	1.5	Less compact than above layer
34- 36	2.0-3.0	Very loose; capped columns and plates; sublimation zone
36- 40	1.0-2.0	Dendritic crystals increasing in size and looseness towards base
40		Very thin (1 mm) melt horizon
40- 43	2.0	Slightly loose; granular
43		2 mm crust
43- 45	2.0-4.0	Sublimation zone; the layer varies in depth and thickness very loose; plates and many air spaces
45- 53	.5 and less	Very hard; irregular and discontinuous layer; buried sastrugi
53- 58	1.0-1.5	Slightly compact--granular
58		Very thin (1 mm) crust
58- 64	.5-2.5	Loose; dendritic and irregular crystals
64- 74	1.0-1.5	Top portion slightly compact; base fairly loose with a slightly larger grains
74		2 mm crust
74- 82	1.0-2.0	Grain size and looseness decrease with depth
82- 85	2.5-5.0	Loose; many air spaces; plates; sublimation zone
85		2 mm crust
85- 97	1.0-1.5	Fairly compact; granular
97-100	.5-1.0	Compact, granular
100-109	1.0-1.5	Slightly loose; granular
109-116	.5-1.0	Slightly looser than layer 97-100
116		2 mm crust
116-119	1.0-1.5	Slightly loose; granular
119-124	.5-1.0	Fairly compact; granular
124-126	1.0-1.5	Slightly loose; granular
126-127	.5-1.0	Fairly compact; granular
127-129	1.5-2.0	Slightly loose; granular
129-134	.5-1.0	Same as layer 126-127

Station LA-Byrd Traverse Mile 540 (Continued)

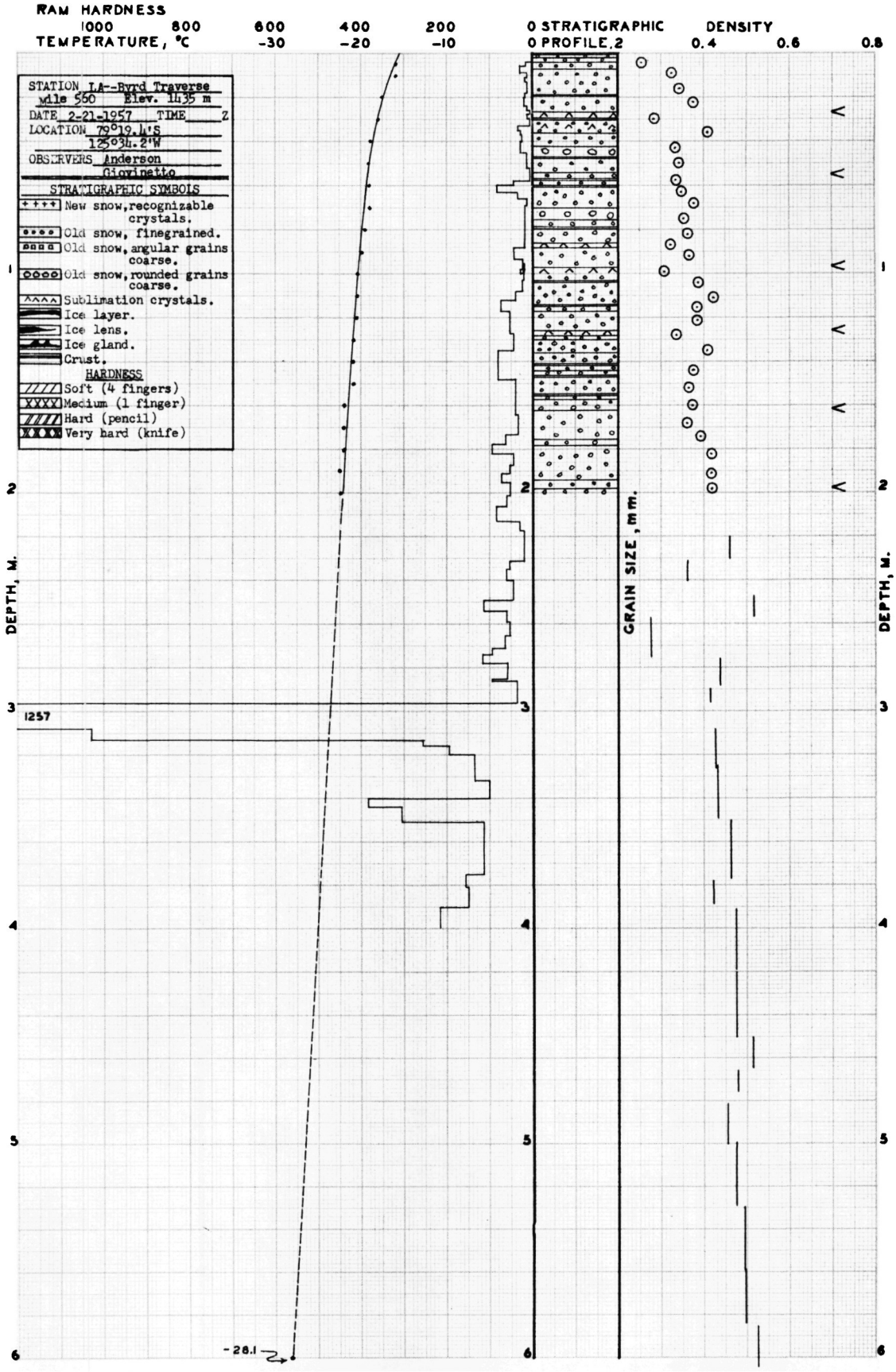
STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
134-135	1.0-1.5	Slightly loose; granular
135-136	.5-1.0	Same as layer 126-127, however, this layer is not continuous
136-139	1.0-3.0	Loose; dendritic and irregular crystals, sublimation zone
139-140	.5-1.0	Fairly compact; granular
140-146	1.0-1.5	Slightly compact; granular; more compact zones at 141 and 143
146-149	.5-1.0	Compact, granular
149-165	1.0-1.5	Slightly compact; granular
165-166	1.0-1.5	Slightly softer than above layer
166-172	1.0-1.5	Divided into 4 equal layers; layers 1 and 3 are softer than layers 2 and 4
172-176	.5	Compact, granular
176-184	1.0	Less compact than above layer
184-190	1.0-1.5	Slightly compact; granular
190-198		Same as zones 2 and 4 of layer 166-172
198-200	1.5	Fairly loose; granular
200		Pit bottom

RAM HARDNESS DATA SHEET

Station LA--Byrd Traverse
Observers Anderson, Giovinetto

Depth cm	Hardness Number, Kg
Mile 550	
21 February 1957	
0- 3	
3- 5	7
5- 7	17
7- 10	15
10- 12	22
12- 14	42
14- 16	32
16- 17	32
17- 18	32
18- 21	12
21- 23	32
23- 27	32
27- 32	20
32- 34	17
34- 38	10
38- 41	22
41- 44	22
44- 46	17
46- 49	22
49- 51	47
51- 56	20
56- 59	22
59- 65	67
65- 69	27
69- 76	23
76- 81	52
81- 83	27
83- 87	28
87- 93	20
93- 99	20
99-103	28
103-111	15
111-116	23
116-120	40
120-124	53
124-129	53
129-133	90
133-137	40
137-143	45
143-150	74
150-155	63
155-157	28
157-167	53
167-179	61
179-183	73
183-186	96
186-188	141
188-191	66
191-195	51
195-204	76
204-206	51
206-213	70
213-218	96
218-223	60
223-229	96
229-234	78
234-237	36
237-243	51
243-250	45
250-255	60
255-261	156
261-263	81
263-280	103
280-289	56
289-290	156
290-300	67
300-308	63
308-315	71
315-324	90
324-335	75
335-338	57
338-350	320
350-355	127
355-361	132
361-368	114
368-380	132
380-387	200
387-400	134


RAM HARDNESS
1000
800
600
400
200
0
TEMPERATURE, °C
-30
-20
-10
0 STRATIGRAPHIC PROFILE, 2
DENSITY
0.4
0.6
0.8
STATION LA--Byrd Traverse
mile 550 Elev. 11,35 m
DATE 2-21-1957 TIME Z
LOCATION 79°19.4'S
125°34.2'W
OBSERVERS Anderson
Giovinetto
STRATIGRAPHIC SYMBOLS
New snow, recognizable crystals.
Old snow, finegrained.
Old snow, angular grains coarse.
Old snow, rounded grains coarse.
Sublimation crystals.
Ice layer.
Ice lens.
Ice gland.
Crust.
HARDNESS
Soft (4 fingers)
Medium (1 finger)
Hard (pencil)
Very hard (knife)
DEPTH, M.
GRAIN SIZE, mm.
1257
-28.1

LA-Byrd Traverse
Station Mile 560
Date 21 February 1957
Observers Anderson, Giovinetto

STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
		Fresh falling snow consisting of clusters of irregular crystals about 1 mm in size
0- 2	1.0	Soft, new snow
2- 4	1.0-1.5	Very soft; irregular grains
4- 7	1.5	Fairly hard; granular
7- 19	1.0	Soft, granular
19		2 mm crust
19- 20	1.0	Soft layer of variable thickness
20		2 mm crust
20- 27	.5-1.0	Compact, granular
27- 29	2.0-3.0	Very loose with many air spaces; broken plates and columns; sublimation zone
29		2 mm crust
29- 31	1.0	Fairly loose; granular
31- 32	2.0-4.0	Very loose with many air spaces; broken plates; sublimation zone
32- 36	.5	Very compact
36- 42	1.0-1.5	Fairly loose; change between this layer and one above is very gradual
42- 47	2.0	Very loose; granular
47		2 mm crust
47- 54	1.0-2.0	Fairly loose; granular
54- 55	.5	Fairly compact; granular
55- 67	1.0-2.0	Very loose; granular; 2 mm crusts at 57 and 60
67- 70	1.0	Compact, granular
70- 75	1.0-2.0	Soft, granular
75- 77	1.0	Compact, granular
77- 79	1.0-1.5	Fairly soft; granular
79		2 mm crust
79- 86	1.0	Fairly compact; granular
86- 88	2.0-4.0	Very loose; broken plates and capped columns; sublimation zone
88- 97	1.0	Fairly compact; granular
97-103	1.0-2.5	Upper part very loose with plate crystals evident, indicating a sublimation zone; this changes gradually into a finer grained fairly compact zone at base of layer
103		1 mm crust
103-106	1.0	Compact, granular
106-107	1.0-2.0	Fairly compact; granular
107-114	.5-1.0	Compact, granular
114		2 mm crust
114-117	1.0-2.0	Fairly loose; granular

Station LA-Byrd Traverse Mile 560 (Continued)

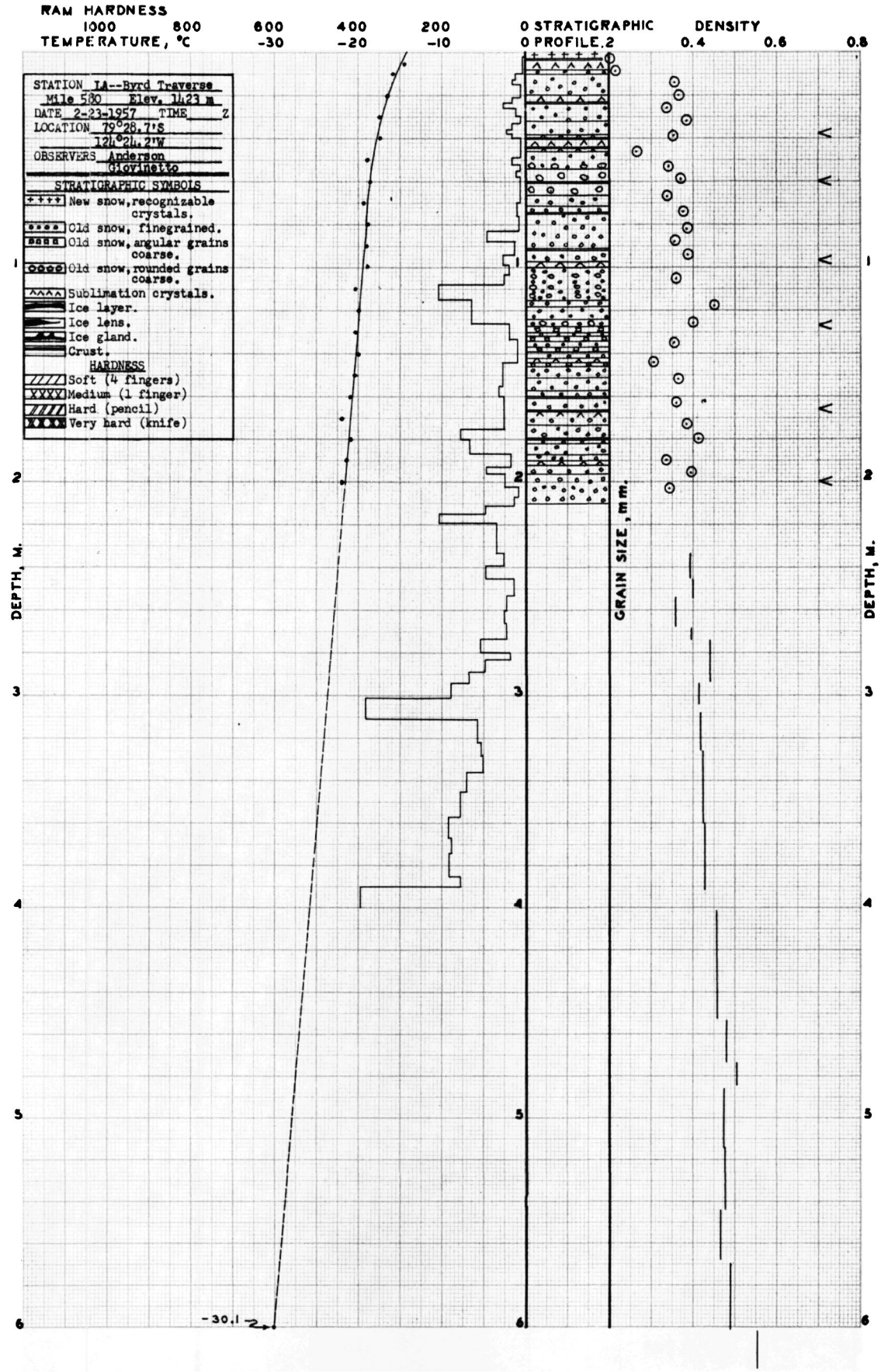
STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
117-126	1.0-2.0	Fairly compact; granular
126-128	1.0-2.0	Loose layer containing broken column crystals; sublimation zone
128-130	1.0-2.0	Fairly compact; granular
130-131	.5	Very compact and crust like varying in thickness from 1 to 10 mm
131-136	1.0	Compact, granular
136-144	1.0-2.0	Fairly soft; granular; 1 mm crust at 141
144-157	1.0-2.0	Fairly loose; granular; 1 mm crusts at 146, 148, 155
157-159	.5-1.0	Very compact; granular
159-161	1.0-2.0	Fairly compact; granular
161-162		2 - 3 mm very hard crust
162-175	1.0-2.0	Larger grains toward top of layer; smaller grained and more compact toward base
175-176	1.0-2.0	Fairly loose; granular
176-178	.5	Very compact
178-194	1.0-2.0	Fairly compact; granular
194-198	.5	Very compact
198-200	1.0-2.0	Fairly loose; granular
200		Pit bottom

RAM HARDNESS DATA SHEET

Station LA--Byrd Traverse
Observers Anderson, Giovinetto

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Mile 570		239-244	96		
22 February 1957		244-256	93.5		
0- 3		256-265	121		
3- 4	12	265-275	111		
4- 7	35.3	275-285	156		
7- 10	92	285-288	157		
10- 12	32	288-292	194.5		
12- 14	17	292-298	107		
14- 18	9.3	298-307	173.6		
18- 20	32	307-315	119.5		
20- 22	32	315-328	122.3		
22- 25	52	328-341	237.7		
25- 30	26	341-350	290.3		
30- 34	17	350-362	132		
34- 40	17	362-369	157		
40- 46	7	369-380	225.1		
46- 55	15.3	380-392	157		
55- 57	32	392-400	344.5		
57- 62	32				
62- 65	22				
65- 74	18.6				
74- 78	28				
78- 83	43				
83- 87	28				
87- 90	136.3				
90- 93	119.6				
93- 98	33				
98-104	19.6				
104-109	33				
109-113	53				
113-127	253				
127-131	125.2				
131-137	86.3				
137-140	65				
140-145	59				
145-150	59				
150-155	59				
155-161	50				
161-173	50				
173-182	65				
182-187	96				
187-197	81				
197-205	99.7				
205-217	156				
217-229	156				
229-234	156				
234-239	126				


RAM HARDNESS
1000 800 600 400 200
TEMPERATURE, °C -30 -20 -10
0 STRATIGRAPHIC
0 PROFILE, 2
DENSITY
0.4 0.6 0.8
STATION La--Byrd Traverse
Mile 580 Elev. 1423 m
DATE 2-23-1957 TIME Z
LOCATION 79°28.7'S
120°24.2'W
OBSERVERS Anderson
Giovinetto
STRATIGRAPHIC SYMBOLS
New snow, recognizable crystals.
Old snow, finegrained.
Old snow, angular grains coarse.
Old snow, rounded grains coarse.
Sublimation crystals.
Ice layer.
Ice lens.
Ice gland.
Crust.
HARDNESS
Soft (4 fingers)
Medium (1 finger)
Hard (pencil)
Very hard (knife)
DEPTH, M.
GRAIN SIZE, mm.
-30.1
1
2
3
4
5
6

LA-Byrd Traverse
Station Mile 580
Date 23 February 1957
Observers Anderson, Giovinetto

STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
0- 3	.5-1.0	Very soft wet snow; wetness and granule size decrease towards base of layer where compaction is beginning
3		2 mm crust
3- 6	1.0-1.5	Very loose, capped columns; sublimation zone
6- 8	.5-1.0	Loose, broken columns; sublimation zone
8- 10	1.0	Fairly compact; irregular crystals
10- 11	1.0	Loose; granular
11- 20	1.0	Fairly compact; granular
20- 23	.5-1.5	Fairly loose; dendritic and irregular crystals; sublimation zone
23		2 mm crust
23- 32	.5-1.5	Gradual change in layer from a compact top to a fairly loose base
32- 38	.5	Very compact, discontinuous layer
38- 44	2.0-3.0	Loose, broken capped columns; sublimation zone; 2 mm crust at 40
44		2 mm crust
44- 46	3.0-4.0	Very loose; needles and capped columns; sublimation zone
46- 54	1.5-3.0	Fairly compact; granular; gradual change to larger and looser grains towards base
54- 56	1.0	Compact, granular
56- 60	2.0	Fairly loose; granular
60		2 mm crust
60- 66	2.0-3.5	Loose; large irregular granules
66- 71	1.5-3.0	Slightly more compact than above layer
71- 74	.5-1.0	Very compact; discontinuous
74- 91	1.0-2.0	Fairly loose; granular; slightly more compact zone from 85-86; thin crusts (2mm) at 75 and 76
91		2 mm crust
91- 97	1.0-2.0	Fairly compact; granular
97-100	2.0-4.0	Very loose; broken capped columns; sublimation zone
100-115	.5-3.0	Eight alternating compact and soft layers; starts compact and ends soft
115-118	1.0	Compact, granular
118-119	3.0	Soft and loose as soft layers in 100-115
119-124	1.0-1.5	Fairly compact; granular
124-127	1.0-1.5	Fairly loose; some dendritic crystals
127-130	2.0	Loose; broken columns
130-132	1.0-2.0	Harder than above layer, granular
132-134	2.0	Loose; broken columns
134-137	1.0-2.0	Same as layer 130-132
137-139	2.0	Same as layer 127-130
139		2 mm crust

Station LA-Byrd Traverse
Mile 580
(Continued)

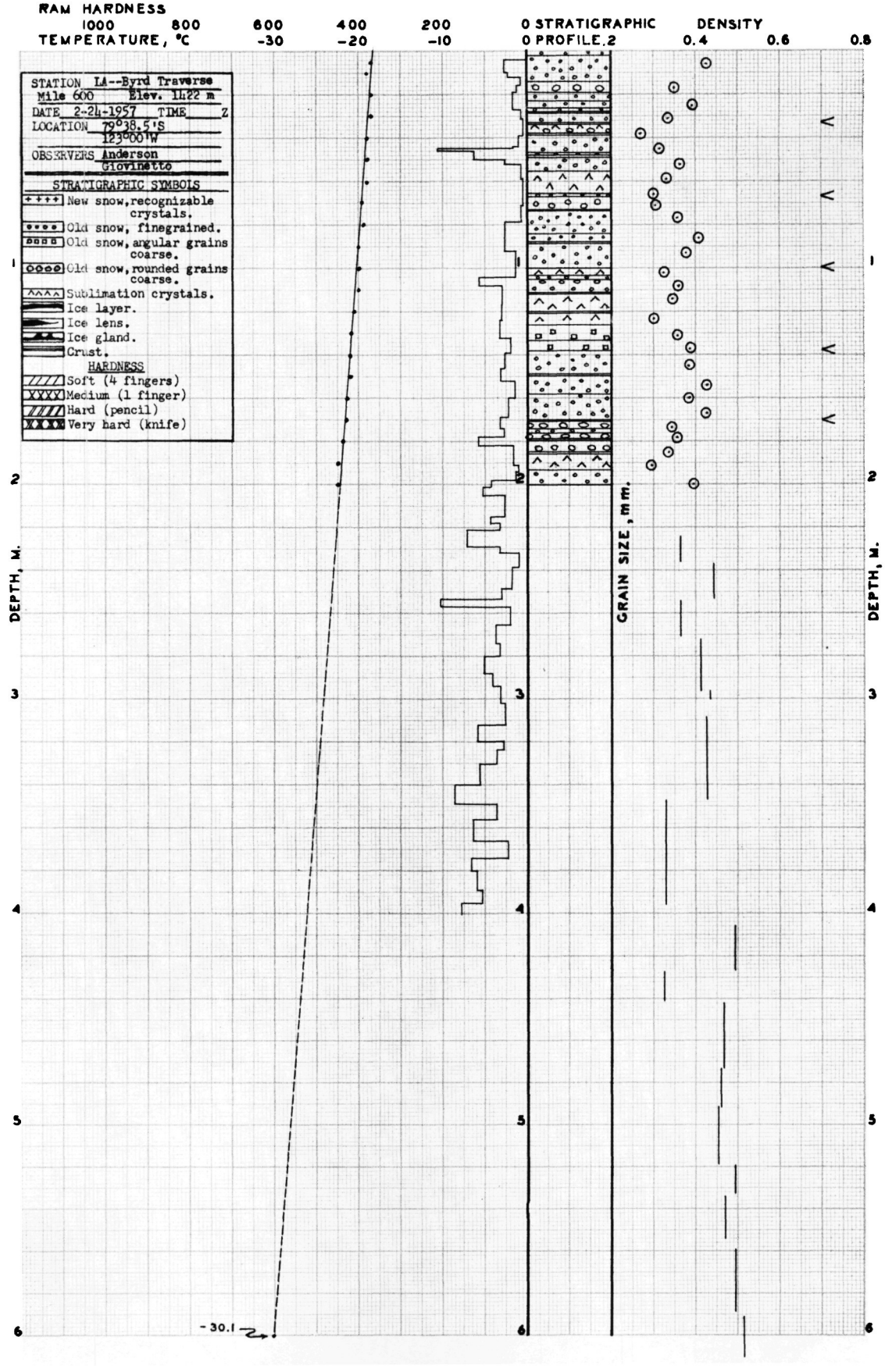
STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
139-140	2.0	Loose; broken columns
140-142	2.0	Fairly compact; some dendritic crystals
142-144	3.5-4.5	Loose; broken columns and capped columns; sublimation zone
144-146	1.5-2.5	Fairly loose; some broken capped columns
146-151	1.0-2.0	Fairly compact; granular
151-154	1.0-2.0	Fairly loose; granular
154-157	1.0-2.0	Fairly compact; granular
157-166	1.0-2.0	Fairly loose; granular; 2 mm crust at 160
166		2 mm crust
166-168	2.0-3.5	Loose broken columns; sublimation zone
168-173	1.0-2.0	Fairly compact; granular
173-179	.5-1.0	Compact, granular
179-182	1.0-2.0	Fairly compact; granular; 3 mm crust at 180
182-187	.5-1.0	Compact, granular
187-189	1.0-2.0	Fairly compact; granular
189-190		Same as layer 168-173 only slightly more compact
190-192	1.0-2.0	Fairly loose; broken columns and needles; sublimation zone
192-196	.5	Very compact
196-210	1.0-2.0	Fairly compact; granular
210		Pit bottom

RAM HARDNESS DATA SHEET

Station LA--Byrd Traverse
Observers Anderson, Giovinetto

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Mile 590		225-230	96		
24 February 1957		230-236	36		
0- 4		236-247	47		
4- 12	15	247-255	85		
12- 13	32	255-265	51		
13- 15	17	265-272	70		
15- 16	22	272-273	726		
16- 18	12	273-282	456		
18- 19	32	282-287	97		
19- 21	27	287-294	50		
21- 22	32	294-297	257		
22- 23	32	297-302	367		
23- 25	32	302-308	232		
25- 29	25	308-314	57		
29- 32	32	314-320	82		
32- 35	12	320-327	114		
35- 39	17	327-332	97		
39- 43	32	332-340	82		
43- 49	12	340-349	124		
49- 56	28	349-354	67		
56- 61	8	354-363	157		
61- 66	14	363-373	187		
66- 71	20	373-382	124		
71- 75	78	382-391	207		
75- 79	28	391-398	179		
79- 89	13	398-400	307		
89- 93	28				
93-107	55				
107-110	36				
110-121	230				
121-125	65				
125-131	45				
131-134	86				
134-141	39				
141-145	65				
145-151	49				
151-158	44				
158-165	56				
165-177	27				
177-183	50				
183-189	81				
189-194	60				
194-199	24				
199-204	42				
204-209	42				
209-218	26				
218-225	32				


RAM HARDNESS
1000 800 600 400 200 0
TEMPERATURE, °C -30 -20 -10 0
STRATIGRAPHIC PROFILE,2
DENSITY 0.4 0.6 0.8
STATION L4--Byrd Traverse
Mile 600 Elev. 1122 m
DATE 2-24-1957 TIME Z
LOCATION 79°38.5'S 123°00'W
OBSERVERS Anderson Giovinetto
STRATIGRAPHIC SYMBOLS
New snow, recognizable crystals.
Old snow, finegrained.
Old snow, angular grains coarse.
Old snow, rounded grains coarse.
Sublimation crystals.
Ice layer.
Ice lens.
Ice gland.
Crust.
HARDNESS
Soft (4 fingers)
Medium (1 finger)
Hard (pencil)
Very hard (knife)
DEPTH, M.
GRAIN SIZE, mm.
-30.1

LA-Byrd Traverse
Station Mile 600
Date 24 February 1957
Observers Anderson, Giovinetto

STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
0- 2	1.0	Drift snow
2- 14	.5	Very hard and of a variable thickness
14- 19	1.0-2.0	Soft, granular
19- 23	1.0	Fairly soft, granular
23- 25	.5	Compact, granular
25- 26	1.0	Compact, granular
26- 28	1.0	Soft, granular
28		2 mm crust
28- 33	1.0	Soft, granular
33		2 mm crust
33- 35	2.0	Very soft, columns; sublimation zone
35		2 mm crust
35- 38	1.0	Soft, granular
38		2 mm crust
38- 40	2.0	Very soft, granular
40- 47	.5	Very hard, irregular base
47- 48	2.0-4.0	Very soft, broken columns; sublimation zone
48		2 mm crust
48- 55	1.0-2.0	Fairly soft, granular
55- 56	2.0-4.0	Very soft, columns, sublimation zone
56- 63	2.0-3.0	Fairly soft, broken columns; sublimation zone
63- 65	2.0-4.0	Very soft, columns, sublimation zone
65- 67		Discontinuous hard crust like lens
67- 73	2.0-3.0	Soft, granular
73		2 mm crust
73- 84	1.0-2.0	Fairly compact, granular
84- 88	.5-1.0	Very compact, granular
88		2 mm crust
88-100	1.0-1.5	Compact, granular
100-103	2.0-3.0	Fairly soft, broken columns; sublimation zone
103-105	1.0-2.0	Fairly compact, granular
105-106	2.0	Soft, broken plates; sublimation zone
106-111	1.0-1.5	Compact, some broken columns
111		2 mm crust
111-126	1.0-3.0	Fairly compact, broken plates and columns; sublimation zone; at 120 is a thin undulating crust immediately below which is a soft zone with larger crystals present
126-127	2.0-3.0	Soft, granular
127-133	1.0-2.0	Fairly compact broken plates and columns
133-135	1.0-2.0	Softer than above layer
135-138	1.0-2.0	Fairly compact, broken plates and columns
138-140	1.0-2.0	Softer than above layer

Station LA-Byrd Traverse Mile 600 (Continued)

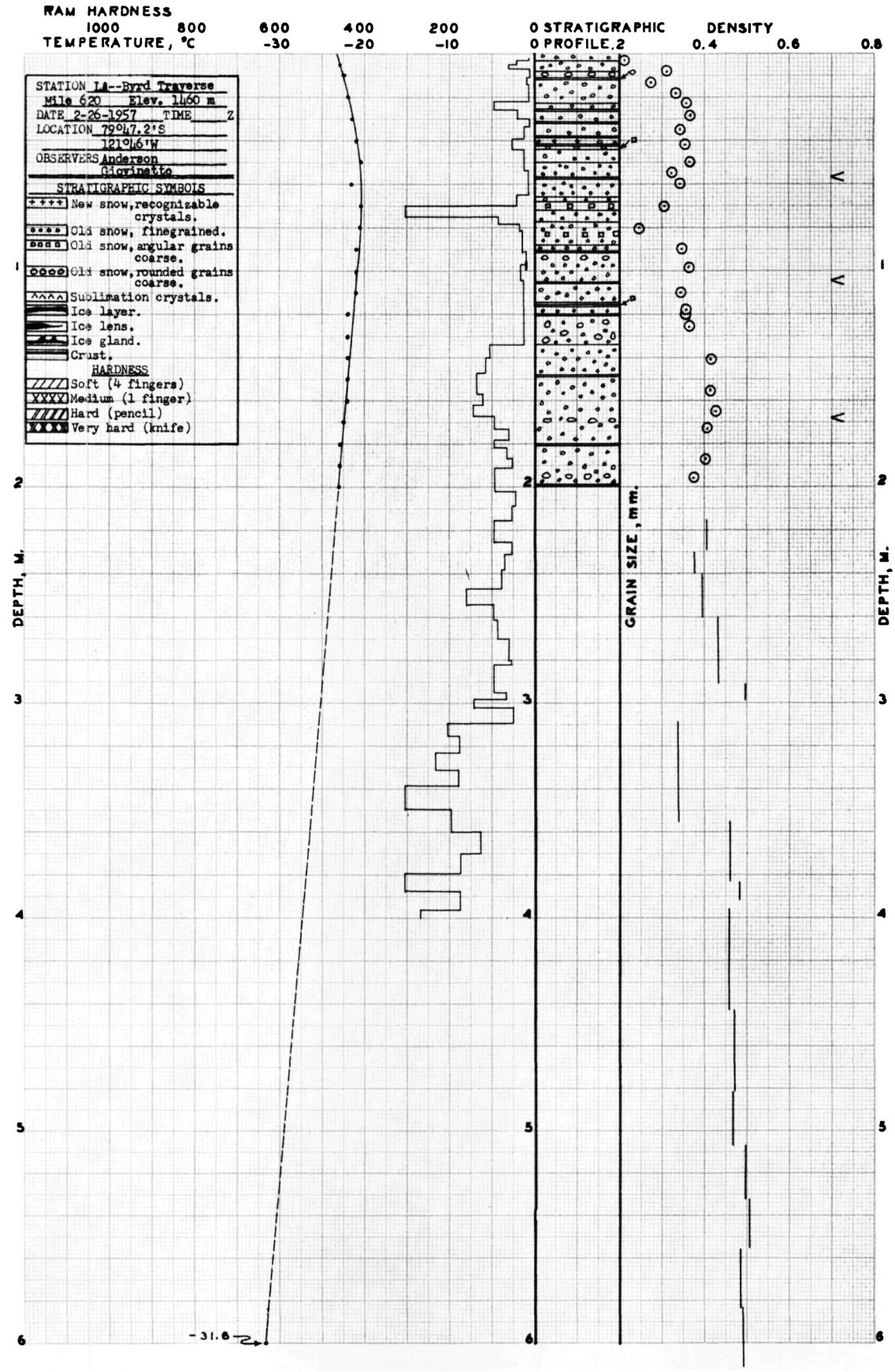
STRATIGRAPHIC DATA SHEET

Depth cm	Grain Size, mm	Remarks
140-149	1.0-1.5	Compact, granular
149		2 mm discontinuous crust
149-158	.5-1.0	Very compact, granular
158-161	1.0-1.5	Fairly compact, granular
161-170	.5-1.0	Very compact; granular
170		2 mm crust
170-174	2.0-3.0	Soft, granular
174-176	.5	Very compact
176-179	2.0-3.0	Soft, granular
179-180	.5	Very compact
180		2 mm crust
180-185	2.0-3.0	Soft, granular
185		2 mm crust
185-187	2.0-3.0	Soft, granular
187-193	2.0-4.0	Very loose; broken columns; sublimation zone
193-200	1.0	Very compact
200		Pit bottom

RAM HARDNESS DATA SHEET

Station LA--Byrd Traverse
Observers Anderson, Giovinetto

Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg	Depth cm	Hardness Number, Kg
Mile 610		235-242	113		
25 February 1957		242-251	123		
0- 1		251-256	126		
1- 4	12	256-265	123		
4- 5	32	265-272	264		
5- 8	22	272-280	44		
8- 10	17	280-285	96		
10- 11	12	285-291	82		
11- 13	17	291-295	119		
13- 16	19	295-300	157		
16- 18	32	300-304	82		
18- 21	32	304-308	82		
21- 26	14	308-316	62		
26- 30	17	316-327	75		
30- 35	20	327-337	82		
35- 38	62	337-341	194		
38- 43	14	341-346	157		
43- 45	47	346-351	157		
45- 47	152	351-359	138		
47- 49	79	359-369	157		
49- 55	19	369-375	157		
55- 62	16	375-378	307		
62- 73	16	378-385	135		
73- 80	14	385-389	119		
80- 89	58	389-396	179		
89- 96	123	396-400	232		
96-105	53				
105-111	45				
111-115	38				
115-122	269				
122-130	97				
130-138	65				
138-142	51				
142-145	36				
145-151	36				
151-157	51				
157-165	40				
165-171	36				
171-184	41				
184-191	70				
191-198	49				
198-204	56				
204-210	31				
210-218	44				
218-227	39				
227-231	81				
231-235	44				


RAM HARDNESS
1000 800 600 400 200 0
TEMPERATURE, °C -30 -20 -10
STRATIGRAPHIC PROFILE
0 .2
DENSITY
0.4 0.6 0.8
STATION La--Byrd Traverse
Mile 620 Elev. 1460 m
DATE 2-26-1957 TIME Z
LOCATION 79°47.2'S
121°46'W
OBSERVERS Anderson
Giovinetto
STRATIGRAPHIC SYMBOLS
New snow, recognizable crystals.
Old snow, finegrained.
Old snow, angular grains coarse.
Old snow, rounded grains coarse.
Sublimation crystals.
Ice layer.
Ice lens.
Ice gland.
Crust.
HARDNESS
Soft (4 fingers)
Medium (1 finger)
Hard (pencil)
Very hard (knife)
DEPTH, M.
GRAIN SIZE, mm.
-31.6
1
2
3
4
5
6

LA-Byrd Traverse
Station Mile 620
Date 26 February 1957
Observers Anderson, Giovinetto

STRATIGRAPHIC DATA SHEET

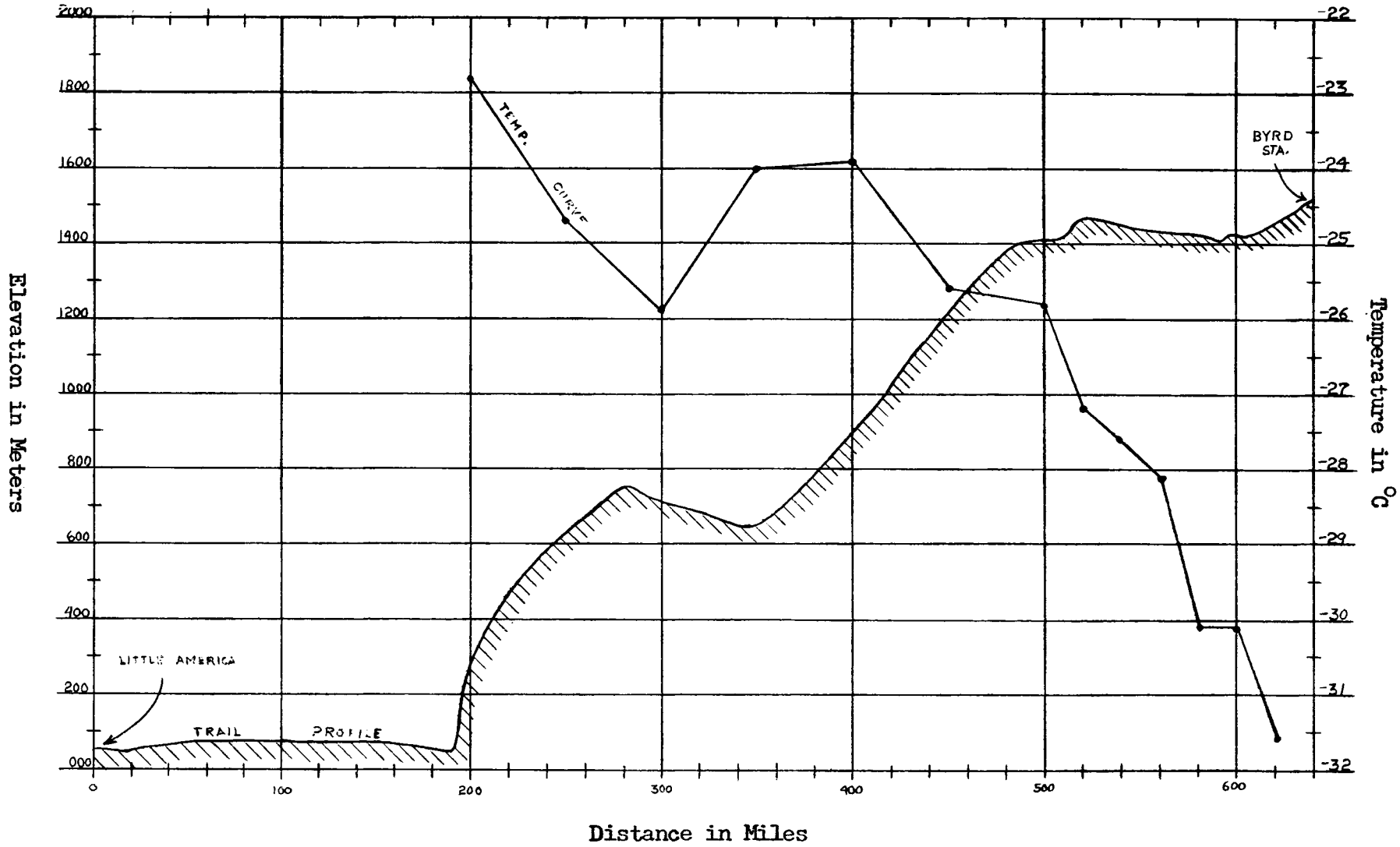
Depth cm	Grain Size, mm	Remarks
0- 3	1.0	Soft drift snow of variable thickness; 0-1 more compact due to wetness
3- 8	1.0	Slightly older drift snow very similar to above layer
8- 11	1.0	Loose; granular
11- 12	1.0-1.5	Very loose; granular
12- 23	1.0	Slightly compact; granular
23- 26	1.5	Same as above, slightly looser
26		2-3 mm crust
26- 32	1.0-1.5	Slightly loose; some dendritic crystals; a compact zone 1 cm thick at 27-28; 2 mm crust at 27
32		2 mm crust
32- 40	1.0	Slightly compact; granular; 2 mm crust at 38
40- 42	1.0	Same as 32-40 but slightly more compact
42		2 mm crust which splits and rejoins
42- 44	1.5	Loose; broken columns and needles
44- 50	1.0	Fairly loose at top and bottom, slightly compact at center
50- 57	1.0-2.0	Slightly compact top to a loose base with larger granules
57		2 mm crust
57- 66	.5-2.0	Slightly compact; dendrites and granules
66- 68	1.0	Compact, granular
68- 72	1.0-2.0	Loose; broken capped columns and irregular grains; 2 mm crusts at 72 and 73
72- 77	1.5	Layer grading from hard to loose from top to bottom
77- 88	.5-2.0	A center loose layer bonded by two compact layers; all layers vary in thickness; center loose layer contains some broken capped columns
88- 91	.5-1.5	Slightly compact; granular
91		2 mm crust
91-115	.5-1.5	Slightly compact; looser at top; 2 mm crusts at 93 and 105
115		2 mm crust
115-116	1.0-2.0	Loose; columns
116-120	1.0	Compact, granular
120		2 mm crust
120-134	.5-2.0	Slightly compact having irregular base; broken capped columns
134-148	.5-1.0	Compact, granular
148		2 mm crust
148-180	.5-1.0	Compact; softer layer with slightly larger crystals occurs at 169 to 170
180		2 mm crust
180-200	.5-1.0	Fairly compact; granular; 2 mm crust at 199
200		Pit bottom

RAM HARDNESS DATA SHEET

Station LA--Byrd Traverse
Observers Anderson, Giovinetto

Depth cm	Hardness Number, Kg
Mile 630	
27 February 1957	
0- 7	
7- 9	12
9- 10	22
10- 12	22
12- 15	5
15- 16	32
16- 18	62
18- 20	17
20- 23	62
23- 25	137
25- 27	77
27- 31	37
31- 36	22
36- 39	52
39- 42	69
42- 47	12
47- 50	35
50- 56	44
56- 63	16
63- 65	27
65- 71	27
71- 80	24
80- 89	24
89- 95	36
95-101	36
101-110	53
110-115	13
115-124	31
124-134	53
134-140	86
140-155	75
155-160	133
160-164	73
164-169	95
169-176	69
176-184	84
184-190	80
190-197	70
197-202	60
202-206	118
206-209	96
209-213	141
213-219	51
219-229	69
229-235	60
235-241	60
241-250	156
250-254	321
254-264	261
264-269	66
269-274	96
274-281	92
281-284	57
284-286	82
286-290	232
290-298	232
298-305	329
305-318	180
318-322	194
322-325	257
325-330	157
330-340	247
340-345	307
345-357	132
357-366	207
366-380	100
380-390	202
390-400	187
Mile 640	
27 February 1957	
0- 9	
9- 11	7
11- 13	12
13- 14	32
14- 16	27
16- 18	22
18- 20	12
20- 22	22
22- 26	24
26- 30	24
30- 36	12
36- 41	26
41- 46	14
46- 50	17
50- 53	32
53- 56	85
56- 58	52
58- 64	19
64- 73	19
73- 80	23
80- 86	27
86- 90	28
90- 93	53
93-102	20
102-106	28
106-115	131
115-120	43
120-123	70
123-128	43
128-131	70
131-132	203
132-133	455
133-136	405
136-140	117
140-148	61
148-155	69
155-162	69
162-171	38
171-179	42
179-185	82
185-190	66
190-197	49
197-203	81
203-212	123
212-220	118
220-228	194
228-235	178
235-242	49
242-248	56
248-254	56
254-267	121
267-279	81
279-283	119
283-287	119
287-290	357
290-296	107
296-312	101
312-317	247
317-321	269
321-330	307
330-339	157
339-350	225
350-357	179
357-365	230
365-372	71
372-378	132
378-391	284
391-400	174

FIRN TEMPERATURES OBTAINED AT DEPTHS OF 6 METERS
ALONG L. A. BYRD TRAVERSE PLOTTED AGAINST PROFILE
OF L. A.--BYRD STATION TRAIL FEBRUARY 1957



ACCUMULATION STAKES ALONG LITTLE AMERICA-BYRD STATION TRAIL

Mile	Elevation meters	Date Emplaced	Date Read	Total Accumulation cms	Date Read	Total Accumulation cms
20	59	Jan. 29, 1957	October 1957	53	Mar. 3, 1958	86
40	65	Jan. 29, 1957	October 1957	48	Mar. 2, 1958	68
60	72	Jan. 30, 1957	October 1957	55	Mar. 2, 1958	73.5
80	79	Jan. 30, 1957	October 1957	46	Mar. 2, 1958	57
100	78	Jan. 30, 1957	October 1957	40	Mar. 2, 1958	56
120	75	Jan. 31, 1957	October 1957	33	Mar. 1, 1958	36
140	77	Jan. 31, 1957	October 1957	32	Mar. 1, 1958	37
160	69	Feb. 1, 1957	October 1957	27	Mar. 1, 1958	34
180	61	Feb. 1, 1957	October 1957	19	Feb. 28, 1958	33
200	288	Feb. 4, 1957	October 1957	11	Feb. 27, 1958	24
250	603	Feb. 6, 1957	October 1957	44	Feb. 26, 1958	52
300	719	Feb. 8, 1957	October 1957	25	Feb. 26, 1958	41
350	649	Feb. 10, 1957	October 1957	21	Feb. 25, 1958	27.5
400	909	Feb. 12, 1957	--	--	--	--
450	1233	Feb. 14, 1957	--	--	Feb. 25, 1958	46.5
500	1404	Feb. 16, 1957	--	--	Feb. 24, 1958	42